17780/B

ON

GRANULAR DEGENERATION

OF THE

KIDNIES, &c.

PRINTED BY JOHN STARK, EDINBURGH.

54672

1890.

Jco. D. Young

ON GRANULAR DEGENERATION OF THE KIDNIES,

AND ITS CONNEXION WITH DROPSY, INFLAMMATIONS, AND OTHER DISEASES.

BY
ROBERT CHRISTISON, M.D. F.R.S.E.
PRESIDENT OF THE ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH,
PROFESSOR OF MATERIA MEDICA, AND ONE OF THE PROFESSORS OF
CLINICAL MEDICINE, IN THE UNIVERSITY OF EDINBURGH, &c.

EDINBURGH:
ADAM AND CHARLES BLACK, NORTH BRIDGE:
AND LONGMAN, ORME, BROWN, GREEN, AND LONGMANS,
LONDON.

MDCCCXXXIX.

1257
/ Fl

WELLCOME
HISTORICAL
MEDICAL
LIBRARY

PREFACE.

In the year 1827 *Dr Bright* announced in his "Reports of Medical Cases," that dropsy frequently depends on a peculiar degeneration of the structure of the kidnies; and that this change of structure is likewise attended with a liability to other diseases, more especially of an inflammatory nature, and is indicated by the presence of albumen in the urinary secretion. It was afterwards found, as in regard to many other important discoveries in pathology, that various authors had previously made observations, which, if followed out, might have led them on to the general principles established by *Dr Bright.* Among these the names of *Dr Blackall, Dr Alison, Professor Andral,* and especially of *Dr Wells,* may be deservedly mentioned. It is not however by a few fortuitous observations, and still less by obscure and incomplete inductions, that the merit of an original discoverer in medical science is to be either gained on the one hand or lost on the other. Formerly physicians were in possession of only a few scattered facts and dubious inferences respecting the connexion between dropsy and diseased kidney; and these were almost disregarded, alike in science and in practice. Now they may become intimately acquainted with a disease of extreme frequency, which manifests itself by characteristic symptoms, and singularly modifies and engenders a great variety of other long familiar maladies. For this important step in the progress of knowledge medicine is indebted to *Dr Bright,*—together with those inquirers, whom his discovery has called forth, to explore with more minuteness the regions he has pointed out.

Notwithstanding the novelty and interest of these researches, some time elapsed before they received the attention which they ought at once to have commanded. My position, as one of the physicians of the Infirmary of this city, having given me an opportunity of repeating and verifying the material parts of *Dr Bright's* statements, I made the results public in a short paper in 1829.* And in 1831 my late lamented friend and colleague in the hospital, *Dr James Gregory*, ably followed up and strengthened this confirmation by a comprehensive digest of his own experience, as well as of that of myself and his other hospital colleagues, for the two preceding years.†

---

* Edinburgh Med. and Surg. Journal, October 1829, Observations on the variety of Dropsy which depends on Diseased Kidney.

† Ibidem, October 1831, On Diseased States of the Kidney connected during life with Albuminous Urine.

Nevertheless several years more passed by before the subject was taken up anywhere else; and to the present day, strange as it may seem, Guy's Hospital in London and the Edinburgh Infirmary continue to be the only institutions of the kind in Britain, which may be said to have contributed to the general stock in this branch of pathological knowledge.

In 1834 the subject was also investigated by *Dr Osborne* of Dublin,* who showed that the disease is not less frequent there than in the two other metropolitan cities, and who has advanced some views as to the treatment, which have since been generally adopted. About the same time the subject began to attract notice in France. In Paris, Montpellier, and Strasbourg, Bright's disease has been unequivocally recognized by the first authorities in pathology; and *M. Rayer* in 1837,* and *M. Solon*† in the present year, have published the fruits of their experience in distinct treatises. During the last four years too, several important papers have appeared from time to time in the Medical Journals of Great Britain and of France‡; which, in common with the more extended researches already specified, all tend towards the same conclusions,—namely to establish the exceeding frequency of the disease, and the accuracy and comprehensiveness of *Dr Bright's* original description.

---

* On the Nature and Treatment of Dropsies accompanied by coagulable urine and suppressed perspiration. By Jonathan Osborne, M. D. Physician to Sir Patrick Dun's Hospital. Dublin Journal of Medical and Chemical Science, January 1834. The paper has been since published in a separate form, with additions.

---

* Traité des Maladies des Reins, &c. Par P. Rayer, Médecin de l'Hopital de la Charité. 2eme livraison. *Néphrite Albumineuse*. Paris, 1837.

† De l'Albuminurie, ou Hydropisie causée par maladie des Reins. Par le Docteur Martin Solon, Médecin de l'Hopital Beaujon. Paris, 1838.

‡ 1. On the Epidemic Scarlatina and Dropsical Affection as it prevailed epidemically in 1832. By Mr G. Hamilton. Edin. Med. and Surg. Journ. January 1833.

2. Considérations et Observations sur l'Hydropisie Symptomatique d'une lésion spéciale des Reins. Par J. C. Sabatier, D. M. Archives Générales de Médecine, Juillet 1834.

3. Observations on Renal Dropsy by John Anderson, London Medical Gazette, xv. 835. 1835.

4. On Scarlet Fever as it prevailed epidemically in Edinburgh in 1835–6. By James Stark, M. D. Edin. Med. and Surg. Journ. October 1836.

5. The Article *Urine* in Dictionnaire de Médecine et de Chirurgie Pratiques. Par M. Martin Solon. 1836.

6. Cases and Observations, illustrative of Renal Disease, accompanied with the secretion of Albuminous Urine. By Richard Bright, M. D., &c. in Guy's Hospital Reports, No. 2. 1836.

Some idea of the prevalence of the disorder may be formed from the following facts. Confining the attention to the most common of its consequences, the several forms of dropsy,—it appears from the researches of a late author, *Dr Mateer* of Belfast, extending through a period of twelve years and over 2000 cases of all diseases except fever, that one-sixth at least is formed of cases of dropsy; and that of these

---

7. On the coagulability of the Urine as a Diagnostic and Therapeutic sign of Dropsies. By William Mateer, M. D. Physician to the Belfast Fever Hospital, Edin. Med. and Surg. Journal for January 1837.

8. Lettre sur l'Albuminurie, par M. C. Forget, Professeur de Clinique Médicale à Strasbourg, Gazette Médicale de Paris, Septembre 1837.

M. Solon also mentions several Parisian Theses on this subject which have been published since 1833, but which I have not seen.

one-half prove fatal. But from the inquiries of *Dr Wells*, it may be deduced that 55 per cent of all dropsies are connected with diseased kidnies; my own observation would raise the amount to fully three-fourths of the whole; and according to the experience of *Dr Bright*, the ratio is even higher. The last author found on one occasion, from an extensive trial among the patients of Guy's Hospital indiscriminately, that one in eleven presented signs of an affection of the kidnies; and on another occasion the proportion was so high as one in six.

In such circumstances, the apathy with which the invaluable discoveries of *Dr Bright* continue to be regarded by many is most unaccountable. It is only within the last two years that medical men in this city have generally admitted the accuracy of his researches. I still meet with respectable members of the profession who seem inclined to adhere to their scepticism. And in a late visit to London I found to my surprise that by some medical gentlemen of the metropolis the doctrines of *Dr Bright* continue to be called in question. This is surely a very strange result of the numerous extended inquiries which have now been made, and all with one invariable result. I do not know a single investigation, of such extent as to deserve the name, which has contradicted in any material point the general principles first announced in 1827. And as to confirmatory researches, I shall take the liberty of expressing my sentiments in the language of *Dr Osborne*, who remarks, that " the number of observations recorded" (and this be it observed so far back as 1834) " must be admitted to have been greater than has within many years been brought to bear on any one individual proposition in medical science."

Were an apology wanted then for the appearance of the present treatise, the preceding exposition might perhaps be considered not inadequate. But other reasons have also actuated me. The subject I have undertaken to elucidate has been more or less an express object of study with me ever since the publication of Dr Bright's Reports in 1827. Some of the general facts which have thus been deduced have gone forth in an imperfect form through the medium of my lectures delivered from time to time in the Clinical Courses of this University during the last six years. Occasionally I perceive from the Journals, that others have been expending much pains in ascertaining points which have here been for some time determined; and that others call in question facts which have been long placed out of the reach of controversy. A few received doctrines, of much importance both to pathology and to practice, have appeared to me doubtful, if not inconsistent with facts, and therefore to deserve early revision. One interesting department, the pathological condition of the blood, has hitherto been barely touched upon, and that chiefly in points which were started in my paper in 1829. On farther investigation it has appeared to me, not only that the special facts formerly advanced in an isolated shape may be now stated with full confidence in more general terms, but likewise that the entire subject may be presented with new features of interest. Lastly, I had long thought that the students of this University and the profession at large stood in need of an easily accessible work on Granular Degeneration of the Kidnies. Nor has the publication of the excellent memoir of *Dr Osborne* altered this opinion; since the ground we have taken up is somewhat different, and the doctrines to which we have been conducted are not always in accord.

It is necessary to explain, that this treatise was framed in the first instance exclusively from the results of personal experience, based on the earliest work of *Dr Bright.* Its substance indeed formed part of my Clinical Lectures delivered in 1831, as well as frequently since; and it was first written without reference to any researches published subsequently to those of *Dr Gregory*, which made their appearance during the same year. Some valuable observations have since been added from the publications of later authors. But these authors may also recognize apparently some of their facts unacknowledged; for I did not think it necessary to refer to others what had long been previously known to myself, and repeatedly made public in the discharge of my professorial duties.

The designation of the disease has been felt as a stumbling-block by every pathologist who has written upon it. *Dr Bright* did not venture to name it at all; in consequence of which physicians, foreign as well as domestic, have very generally in familiar discourse taken the liberty of naming it after himself,—a convenient appellative certainly,—but which I have hesitated to adopt, because I am not sure that in sober narrative we are entitled to use so great a freedom. *M. Solon* has termed the primary disease *Albuminuria* from its principal symptom, the discharge of albumen with the urinary secretion. And *M. Rayer*, assuming that it is essentially an inflammation of a peculiar kind, terms it *Albuminous Nephritis*. Both titles are objectionable. Its inflammatory character in many instances may be doubted; and besides, albuminous urine seems to be secreted in at least one other variety of inflammation of the kidnies, namely inflammation of its pelvis. The euphonious elegance of *M. Solon's* designation will not altogether atone for the philosophical error of naming a disease from one of its symptoms, and from one too which is neither quite invariable nor peculiar. It must at the same time be admitted, that the term adopted in this treatise can as little be successfully defended; for the structure of the morbid deposit is far from being always granular. But it seemed right to retain some reference to the original description of Dr Bright. Future pathological research will probably show that there is more than one organic derangement concerned in the question of nomenclature. Till this point be settled, and until the precise nature of the foreign deposit be determined by chemical analysis or otherwise, it seems almost hopeless to attempt discovering an appropriate and convenient title.

I consider it an improvement upon some prior English notices of this subject, to abandon that view of the organic disease of the kidney, which holds it as subsidiary merely to dropsy,—dropsy being no more than one of its symptoms, or rather one of its secondary affections. There seems a decided advantage in discussing the disease as one primary and idiopathic, which engenders many secondary disorders, and dropsy among others. It is thus only that correct ideas will be formed of its pathological relations. These relations are becoming more and more numerous and interesting every day; so that I am much mistaken if there is any chronic disease of the viscera, excepting pulmonary consumption, which presents features of more importance, either in itself or on account of its intricate connexion with a host of common disorders, than granular degeneration of the kidneys.

The Appendix of Illustrative Cases is selected from a much larger number which have come under my immediate observation during the last ten years. The number might have been easily increased; but those which have been chosen are probably sufficient to exemplify the varying features of the primary disease as well as its secondary affections; and they are the cases whose particulars were ascertained with the greatest minuteness and accuracy. On account of the latter reason it has appeared to me advisable to transfer to these pages a few of the cases formerly published in my paper in 1829 or communicated by me to Dr Gregory in 1831.

University of Edinburgh,
30*th November* 1838.

CONTENTS.

SECTION FIRST.—Pathology and Morbid Appearances, Page 1
Incipient Stage, ... 4
Middle Stage, ... 12
Final Stage, ... 18
SECTION SECOND.—Symptoms and History, . 25
General Symptoms of the Acute Form of the Disease, 26
Of the Chronic Form, . . . 29
State of the Urine in the early stage, . . 32
As to quantity and general properties, . 32
In Density, ... 34
Coagulability, ... 35
Supposed fallacies of coagulability as a test of Granular Degeneration of the Kidnies, . 38
State of the Solids discharged by Urine, . 47
State of the Urine in the advanced stage, . 48
As to quantity and general properties, . 49
Density, ... 50
Coagulability, . . . 51
Solid contents, ... 54
Summary of the properties of the Urine as diagnostic of Granular Degeneration, . . 55
State of the Blood, ... 58
Its state in the early stage, . . 60
Density of the Serum, . . ib.

Existence of Urea in it, . . Page 61
Proportion of Fibrin, . . . 63
Proportion of Hæmatosin, . . . ib.
Method of analysis, . . . 65, note
State of the Blood in the advanced stage, . 67
Density of the Serum, . . . ib.
Existence of Urea in it, . . . 69
Diminution of the Hæmatosin, . 70
State of the Complexion, . . 73
SECTION THIRD.—Secondary diseases connected with Granular Degeneration of the Kidnies, . 74
Dropsy, ... 75
Dyspepsia and Chronic Vomiting, . 85
Diarrhœa, ... 87
Pleurisy and Peritonitis, . . . 90
Catarrh, ... 91
Coma and Apoplexy, . . . 92
Chronic Rheumatism, . . . 97
Pneumonia, ... 98
Diseases of the Heart, . . . 99
Diseased Liver, ... 101
General Infirmity of Constitution, . . 105
SECTION FOURTH.—Causes of Granular Degeneration of the Kidnies, ... 107
Cold a frequent cause, . . . ib.
Some constitutional predisposition necessary, 109
Intemperance a common cause, . . 110
Struma a probable predisposing cause, . 112
Scarlatina a frequent cause, . . 114
Influence of age, sex, rank of life, and profession, 116
SECTION FIFTH.—Prognosis, . . . 120
Is the disease curable? . . . ib.
Prognosis in regard to the secondary disorders, 123
Special prognostics, . . . 126
From the state of the urine, . . 129

SECTION SIXTH.—Treatment, . Page 132
Treatment of the primary disease in the early stage, 132
Blood-letting, ... 133
Counter-irritants; Diaphoretics, . 135
Cathartics, ... 137
Diuretics, ... 138
Mercury, ... 141
Treatment of the advanced stage, . 142
The progress of the disease may sometimes be retarded or arrested for a long time in this stage, 143
Treatment of the Secondary Disorders, . 145
Of Dropsy, ... 146
Of Disorder of the Functions of the Stomach, 155
Of Diarrhœa, ... 156
Of Inflammation of the Serous Membranes, 158
Of Catarrh, ... 159
Of Coma, ... 160
Of Rheumatism, Pneumonia, Diseased Heart and Diseased Liver, . . . 163

ILLUSTRATIVE CASES, WITH REMARKS.

Cases Fatal in various stages and from various secondary affections, with the appearances after death, both Primary and Secondary, . 167
Cases of Recovery, temporary and permanent, . 242

ON

GRANULAR DEGENERATION

OF THE

KIDNIES, &c.

SECTION FIRST.

PATHOLOGY AND MORBID APPEARANCES.

THE disease which forms the subject of the following pages is a morbid degeneration of the kidnies, whose exact nature has not yet been ascertained. In its progress it is essentially chronic. The morbid deposit appears to be always thrown out gradually and slowly. Yet it is occasionally preceded, and often throughout its course becomes for a time accompanied, both by local and general reaction. It is attended by irritation of the kidnies of that kind which is characterized by the excretion of blood or of its albuminous portion. It tends to diminish or suppress the excretion of the solids of the urine, both in the early stage by causing functional disturbance, and likewise in the advanced stage by inducing extensive derangement of organic structure. It also tends singularly to impoverish the blood, by depriving it of a large proportion of its colouring matter.

Ultimately its intrinsic result is to overwhelm the functions of the brain, probably in consequence of the blood, the proper stimulant of that organ, being on the one hand poisoned by the accumulation of urea, and deprived on the other of its colouring matter. But it also engenders in the constitution a certain infirmity or susceptibility; which, while indicated in some measure by a proneness to diseases at large, is more peculiarly characterized by a liability to serous effusions, as well as inflammation of the serous membranes and internal viscera. And it is through the intervention of these secondary circumstances that the disease of the kidnies most generally proves fatal,—much more so than by its intrinsic consequence, the direct annihilation of the cerebral functions.

The disease has been variously divided by authors into several forms, by *Dr Bright* into three, by *M. Martin Solon* into five, by *M. Rayer* into no fewer than six. Of these varieties some, or even all, have been considered mere stages of the same morbid affection. The latter view is exceedingly doubtful. For not merely does the disease thus supposed to be one and the same in nature present a very great diversity of anatomical characters,—the kidney being sometimes much enlarged, sometimes excessively shrivelled, at one time little firmer than recent brain, at another harder than the hardest tubercular liver, in some cases composed of a smooth, homogeneous mass, in others finely granulated like herring-roe, and in others coarsely tuberculated, so as to present somewhat the appearance of being thickly studded with peas;—but likewise the several opposite characters here enumerated may occur in different cases, where the amount of suppression of the solids of the urine during life, and the extent of disorganization of the healthy structure of the kidnies, which are the best measures of the stage or progress of the disorder, seem entirely the same. It is highly probable then, that the various forms mentioned by authors do not exactly belong to the same morbid formation.

When pathologists shall succeed in arranging these forms according to their exact relationships and true differences, some obscure points in the history of the disease, more especially in its symptomatology, will in all likelihood be cleared up. Meanwhile however such an arrangement is impracticable. And the resemblances are such between the manifestations of all the forms during life,—the leading characters of the urine in particular are so much alike, and above all there is such an identity in the secondary diseases to which they lead, and which are the direct sources of danger to life, as well as the chief subjects of treatment,—that there can be no impropriety in considering the whole forms for the present under one head. And to avoid pathological error as far as possible, it may be preferable, in following out the disease in its progress through successive stages, to look rather to the destruction of the healthy structure, than to the morbid deposit.*

In this point of view the progress of the disease may be conveniently divided into three stages,—the incipient stage, which in some instances, if not in all, is a state of congestion or reaction,—the middle stage, where the cortical structure of the kidney is nearly or entirely destroyed,—and the advanced or final stage, where the tubular masses are also invaded and more or less obliterated.

1. *Incipient Stage.*—The organic alterations of structure which constitute the essence of granular degeneration of the kidney are not very easily traced in the early stage. In the generality of instances the change of structure goes on for a long time insidiously. There are scarcely any symptoms to attract the attention either of the patient or of his physician ; much less is there any functional disturbance adequate to endanger life. Hence an opportunity seldom occurs at this period for ascertaining the precise state of the kidnies by anatomical inspection. But on the whole it seems probable that their state in such obscure cases is at the commencement simply a minor de-

---

* See *Note*, p. 21.

gree of what will immediately be described as presenting the pathological characters of the middle stage, namely the deposition of a grayish-yellow, obscurely-granular matter in the cortical structure, with, or possibly without, some degree of sanguineous congestion.

In some cases however, though comparatively few in number, the disease commences more with the characters of an acute affection. And then it may prove fatal soon after its appearance, either simply from the immediate effects of the disturbance to the renal functions, or from the developement of acute, secondary disorders. Several instances of the kind have now been published by the different authors who have made the subject a study;* and I am enabled to add one more to the list. From an examination of the facts hitherto collected it appears, that where the disease in its acute form proves fatal in the early stage, the kidnies are found flabby, friable and unusually large, sometimes more than twice the natural size†; much darker and more vascular externally, and with points and star-like spots of ecchymosis; internally dark, brownish-red, or almost reddish-black, gorged more or less with blood, which drops from a cut surface in unusual quantity; and they often present throughout their whole structure, but more especially in their cortical portion, lines, small roundish specks, or stellated spots of still darker colour, like ecchymosis, and not easily removed by washing. *Rayer* thinks he has ascertained that these spots are often the Malpighian glands in a state of congestion. Sometimes this congested state of the kidney prevails throughout the whole organ equally. At other times, as in the case recorded in the Appendix (Case 1.) the cortical structure seems chiefly affected, and presents a more distinct and more coarsely striated appearance than natural, probably from blood being injected or extravasated in lines into the fundamental cellular tissue. The cortical structure almost always seems considerably broader than in the healthy state, as if it were distended towards the circumference by its gorged condition,—a state which the French pathological writers consider to be hypertrophy of the organ. Occasionally there is also an appearance in the cortical substance of a granular matter of a dark reddish-yellow tint deposited here and there; so that its natural striated texture is somewhat obscured. But the dark colour of the parts renders it very difficult to determine these points accurately. Case 1. however seems a clear example of the kind now referred to.—The lining membrane of the pelvis of the kidney is commonly very vascular and red.

---

* Bright, p. 33, Plate 5. Gregory, xxxvi. 349. Solon, p. 121. Rayer, Plate vi. Fig. 1.

† Rayer has found the kidney to weigh sometimes twelve ounces, the natural weight being four.

The bladder is always found much contracted; and it commonly contains only a drachm or two of urine, which is for the most part pale, always very strongly coagulable by heat, and varying in density from 1014 to 1025. The appearances in other organs vary with the immediate cause of death. These it is unnecessary to state at present, with a single exception,—namely where death is caused directly by the disease inducing suppression of urine and consequent coma. Here it is shown from the appearances within the head, that the immediate cause of death, fatal coma, has frequently nothing to do either with extravasation, congestion, or serous effusion; for in none of these respects do the brain and its membranes necessarily present any marked deviation from their ordinary state, where death was not preceded by head symptoms of any kind. Sometimes however there is found extravasation on the surface of the brain, thickening of the pia mater, effusion of serosity in the subarachnoid cellular tissue, or into the ventricles, congestion of the vessels of the membranes or brain, darkness and injection of the cineritious substance, morbid tumours, &c.—some one or another in short of those organic changes which are wont to be found after death from apoplexy. These appearances, more especially congestion and serous effusion, have been far from uncommon in the practice of Dr Bright. *M. Sabatier* mentions that effusion of serosity is common enough among children. In this city they are certainly much less frequent; and the generality of cases of death by coma present no marked morbid appearance of any kind within the head.*

Morbid appearances of other organs, indicating the existence of secondary or concurring diseases, are sometimes met with, but not so frequently as in the more advanced stages of the primary disorder;—under the description of which they will therefore be more appropriately arranged. The most frequent of them are the signs of inflammation of the serous membranes, and hydropic effusions into the cellular tissue and the sacs of the pleura, pericardium, and peritoneum.

The blood often contains urea in large quantity; and this principle also exists in the serosity of the brain. It may be presumed to be also present in other secretions. This impregnation of the fluids with urea is an invariable fact where the urine has been suppressed or much reduced before death. It was first announced by myself in my paper in 1829; since then I have repeatedly verified the fact; and on several occasions it has been corroborated by the experience of my hospital colleagues. Those therefore who have called in question the accuracy of the original statement have either manipulated incorrectly; or they have looked for urea where it was not to be expected,—namely in cases of death from other causes besides coma, and where the urine was not defective materially in the amount of solids daily discharged.*

---

* In this respect my experience, as well as that of others, is at variance with a statement of Dr Osborne, that "in almost all his fatal cases, when not complicated, life terminates in the production of a low form of arachnitis, as is evinced by examination after death."—(P. 36.)

Between this, the incipient stage of acute cases, and the next unequivocally morbid condition of the kidney, which may be called the middle stage,—where the cortical structure is in a great measure or entirely destroyed,—it is by no means easy to trace the progress of the disease by gradual steps. And for the simple reason, that opportunities are rare; since death, for reasons not very apparent, seldom takes place during this interval.

It may be asked then, what proof there is of the two states of the kidney being connected together as antecedent and consequence? Are they really mere stages of the same disease? Do the cases which commence with obvious local reaction actually lead to a deposit of granular matter, as the proper termination of that reaction where it does not prove fatal in the congestive stage?

There certainly seems some reason for doubting the affirmative as a universal fact. On the one hand it is not improbable, that some of the instances where a dark, flabby, enlarged, congested state of the kidnies has been found in connexion with coagulability and gradual suppression of urine, have been nothing more than cases of ordinary inflammation, or pure nephritis; which, if not cut short by fatal coma, might have continued to run the course of an acute disease, and terminated in resolution or in suppuration, rather than in granular deposition.* And on the other hand there can be no question that granular degeneration is for the most part a chronic disease from first to last, exhibiting at its commencement, and often throughout a great part of its progress, no signs whatever of local reaction or functional disturbance of any kind, except the obscure indications derived from changes in the constitution of the urine. But nevertheless it appears undeniable, that the state of reaction and congestion described above is really connected at times with granular deposition as its incipient or precursory stage. For in the first place such cases as that of Walker related in the Appendix (Case 1.) seem to exhibit the disease actually in its intermediate passage from the first stage, congestion, to the middle stage, destruction of the cortical structure. And secondly, on examining with minuteness into the early history of cases which come under notice only in the middle or advanced stages, they will be sometimes found to have presented a period, when, without any precursory urinary affection, or any other disturbance of the health, the same symptoms of local and general reaction had occurred, though perhaps in a minor degree, with those which will presently be seen to mark the fatal cases found after death to be connected with mere congestion, unintermingled with any deposit of granular matter.

---

* The process for detecting the urea will be found under the head of the Symptoms.

---

* *M. Solon* conceives that true nephritis is quite a distinct disease from that which leads to granular degeneration; that it is marked by different symptoms, namely the absence of œdema, and the presence of severe pain, nausea, and vomiting. Both diagnostics however are incorrect. In very many cases of granular degeneration, as will appear from the sequel, nausea and vomiting are most distressing symptoms; frequently pain in the loins or flank is acute; and repeated instances occur where the same affection presents the negative sign considered by *M. Solon* as diagnostic of nephritis, the absence of œdema. *M. Rayer* again considers granular degeneration to be a variety of inflammation, which he supposes to be distinguished from others by the discharge of albumen with the urine, and which he therefore names Albuminous Nephritis. And he especially describes as distinct from this another variety which he terms Chronic Simple Nephritis; but which, according to his description, seems to differ little in anatomical characters from some varieties of granular degeneration admitted by British pathologists. The respective characters of the urine are said by him to differ; but he does not say how. According to the experience of *Solon* however acute nephritis is attended with albuminous urine. In this city we have few opportunities of ascertaining the diagnosis between nephritis and granular degeneration; as the former is an extremely rare disease.

In this respect granular degeneration of the kidnies partakes of the nature of true tubercular deposition,—in the lungs, for example. That is; though most generally the result of an indolent insidious process, allied as it were to depraved secretion or nutrition, it nevertheless sometimes finds its source in acute reaction.

Although granular deposition may thus form in consequence of acute reaction in the kidnies, it does not seem on any such occasion to take place with rapidity. I have never met at least with any instance, fatal unequivocally in the early stage, where the appearances could have borne such an interpretation. And yet it must be admitted, that cases do at times present themselves, for instance after scarlatina, where the symptoms,—namely, the rapid blanching of the skin independently of œdema, and the swift and permanent loss of colour and density of the urine,—might warrant a presumption to this effect.

2. *Middle Stage.*—The deposition of granular or cheese-like matter, the only important and well established anatomical character of the morbid formation, seems to be for the most part confined at first chiefly to the cortical structure of the kidney. There are exceptions: But they are few in number. As the morbid deposit advances, the natural structure of the organ gradually disappears; at length the former takes the place entirely of the latter; and still the tubular portion of the organ may remain little, if at all affected. This constitutes what I have considered the middle stage. In a great majority of cases, though certainly not in all, it is well-defined, not less by the anatomical

characters here assigned to it, than by the circumstance that it is the condition of the kidney in which the disease most commonly first manifests itself by symptoms, and leads to serious disturbance of the health.

The kidney is now sometimes larger than natural, sometimes of the natural size, very rarely somewhat diminished. Its consistence varies: If enlarged it is commonly softer than in the healthy stage, at times even friable: If diminished, it is on the contrary for the most part rather firmer, at least of natural firmness. Its colour externally is paler, sometimes uniformly grayish, grayish-yellow, or yellowish-red, more commonly of its usual brown tint, but of a paler shade, minutely mottled with gray or yellowish-gray, and often traversed by white indurated streaks, like cicatrices. When its investing membrane is removed, which for the most part may be done with facility, the outside of the kidney is seen to be more distinctly mottled brown and gray, or else uniformly grayish or yellowish, with numerous spots of vascularity, often forming lines or stellated chequerings. The surface has consequently a granular appearance, and is often actually rough from a distinct granular structure. But in this stage there is seldom the lobulated division, and very rarely the botryoidal surface, which frequently occur at a more advanced period. When a longitudinal section is made through the kidney so as to divide it into two symmetrical parts, the external portion usually occupied by the cortical structure is seen broader than natural, sometimes of the natural breadth, sometimes much narrower; and its breadth appears to depend upon whether the kidney is enlarged or contracted. This part, instead of presenting its usual reddish-brown colour, and the appearance of coarse striæ in nearly parallel lines, lying in a direction from the centre of the organ towards its surface, is grayish, grayish-red, grayish-yellow, or reddish-yellow, without any striated arrangement or parallel lines, but of a uniform, sometimes obscurely, sometimes distinctly, granular texture, chequered occasionally with reddish or brownish spots. And there is no distinction, no boundary line, between this structure and that which dips inwards between the tubular masses. When the kidney is injected, the matter according to *Dr Bright* does not penetrate into the cortical portion. The granular structure of the morbid formation is sometimes quite distinct; more generally it is obscure to the naked eye on a cut surface, but becomes visible with a common magnifier or upon tearing the morbid tissue; but occasionally neither by tearing, nor with the aid of a magnifier of four or five powers is the granular character to be distinctly seen, or any other than a smooth homogeneous structure like that of the brain; and in a few cases the structure is not only homogeneous, but friable, and not unlike the fatty degeneration of the liver, although there is no fatty matter in it. Hence some with reason call in question the propriety of the term *granular degeneration* as applicable to all these forms; while others with no less reason suspect that the several forms may be connected with morbid deposites positively different from each other in nature.

The cortical portion of the kidney may be very far advanced in granulation, so as even to be completely disorganized, without the tubular masses presenting any distinct sign of disease. But sometimes the morbid deposit is thrown out between the tubular masses, or even among the rays at their outer ends so as to expand their bases, before the striated appearance of the cortical portion has altogether disappeared. When the tubuli are thus invaded, their striæ are finer and less distinct than natural. Sometimes, according to ***Rayer***, they present red indurations of their papillæ.

The difference observed between different cases as to the size of the kidnies, and the breadth of that portion which is external to the tubuli, seems to depend simply on the morbid deposit being in the one case thrown out more quickly than the healthy structure is removed, while in the other case the absorption of the healthy structure keeps in advance of the deposition of morbid matter. But in some instances too there seems reason for supposing, that the effusion of granular matter takes place in the first instance; that the absorption of the proper cortical texture is a subsequent operation; nay also that the morbid matter last of all is either itself in some measure absorbed or condensed by absorption of its fluid part.

If death is occasioned in the middle stage by coma consequent upon diminished urinary secretion, the bladder is found contracted and nearly empty; and the urine contained in it has a density for the most part between 1010 and 1016, and coagulates more or less with heat and nitric acid. Urea is invariably found in the blood as well as in the serous fluids effused in various quarters. There is rather less appearance than usual of vascularity or injection of vessels in the various membranous textures of the body,—a condition which affects the brain as well as the rest, notwithstanding the manner of death. Sometimes however there are found in the brain or its membranes some of the appearances described above as incidental to death by apoplectic coma in the incipient stage; but this is far from being common.

At times every other organ except the kidnies is found in the healthy state. But frequently in the cases which prove fatal not from coma, but from some secondary disorder, other accessary morbid appearances are presented Often too, where no sign of any secondary disorder had attracted attention during life, and the patient died with symptoms of an affection of the head alone, the pathological inspection betrays a variety of morbid alterations, which show that important organic changes had been silently going on in other organs besides the kidnies. The most frequent secondary appearances are dropsical effusions, namely œdema of the cellular tissue at large, œdema of the lungs, serous effusion into the sacs of the peritonæum, pleura, and pericardium,—emphysema of the lungs, with redness of the bronchial membrane and mucous gorging of the bronchial tubes, as the consequences of catarrh,—the signs of recent inflammation of the lungs, redness, serous or sanguinolent infiltration, or hepatization of their tissue,—the signs of recent pleurisy, peritonitis, or pericarditis, such as turbid serum effused into the cavities, and soft, curd-like lymph upon the membranes,—traces of inflammation of the alimentary canal, more especially of the intestines, redness of the mucous membrane, effusion of lymph on it, enlargement of its glands, or ulceration,—tubercular deposition in the liver,—softening of the spleen—hypertrophy and dilatation of the heart, sometimes with valvular obstructions, sometimes without them,—enlarged mesenteric glands. Among the rarer appearances may be mentioned œdema of the glottis, ulceration of the larynx, redness of the villous coat of the stomach, vascularity of the mucous membrane of the urinary bladder, induration of the spleen. In many cases too traces are found of old attacks of visceral disease, more especially of pneumonia, pleurisy, peritonitis, and pericarditis. These secondary derangements sometimes occur in the incipient stage, especially those indicating recent inflammation. They are much more frequent however in the middle stage, and still more so when the primary disease has made farther progress.

3. *Advanced Stage*. As the morbid deposition proceeds, it gradually pervades not only the cortical, but likewise the tubular portion of the kidnies,—occasioning in the latter as in the former both a morbid formation, and absorption of the natural structure. This may be viewed as the advanced or final stage of the disease. In the earlier part of this period in its progress the external aspect of the kidnies is much the same as in the middle stage, and the chief difference observed internally is that the grayish-yellow matter is partially deposited between the tubular masses or even among the fibres of the tubuli,—in the one case appearing to flatten the tubuli, and in the other to expand their bases. But in the progress of disorganization the appearances alter somewhat. The kidnies are still sometimes of the natural size, or even larger ; but more generally they are diminished, often greatly so, and occasionally to such a degree as not to exceed two inches in length. Their surface is sometimes lobulated,

commonly pale, very frequently rough and irregular, or even botryoidal, like the roe of the salmon, or the mineral pisolite. The common colour outwardly is uniform pale grayish-yellow, sometimes with vascular spots, more commonly without them ; but when very much reduced in size, the proper brownish-red tint is often preserved. Their firmness varies exceedingly, from that of healthy liver to that of the same organ when affected with hard tubercle ; and *Dr Bright* has sometimes found them so hard as to cut almost like cartilage. A longitudinal section displays various appearances, according as the kidney is diminished or not in size. If it is not less than natural, the portion usually occupied by the cortical structure is of the natural breadth and entirely occupied by grayish-yellow granulation, or by a homogeneous substance somewhat like fatty degeneration of the liver ; the same matter is extensively deposited in the central portion between the tubular masses, and frequently among the striæ of the tubuli themselves ; and the tubuli are pale flesh-red in colour, more finely striated than natural, compressed, diminished, broken up, or some of them even entirely obliterated, and their place occupied by the morbid deposit. If the kidney, as more generally happens, is reduced in size, the cortical portion is contracted in breadth ; so that the outer extremities of the tubular masses are pushed as it were towards the external surface. The tubular portion presents the same appearance with what has just been described; but the granular deposit among the tubuli is less extensive. In the progress of matters the kidney is sometimes seen converted into one entire mass of uniform granular or homogeneous degeneration, with the exception of a single tubulus at one end, or perhaps one at each extremity. In other instances, where the morbid deposition has been either scanty from the first, or has subsequently been absorbed, we sometimes find one of the kidnies exceedingly small, flabby, thin, and so entirely deprived of its proper structure, that no vestige of either cortical or tubular substance remains. In such cases the ureter is of course useless; and in one instance of the kind *M. Solon* found its canal obliterated; but in all which have come under my observation it was pervious. In a few instances firm tubercle-like masses are diffused throughout the softer granular matter. More frequently there are little cavities or cysts interspersed; which are either true cysts, or more commonly the infundibula remaining after their corresponding tubuli have been destroyed. It is usual to find one kidney more advanced in disorganization than the other; and in general this is the right. Occasionally one of them is in the very last stage of the disease, the whole cortical and tubular structure having disappeared, while the other is but slightly advanced in the final stage, or even in the middle stage only. By thus comparing the state of the kidnies in the same cases, the successive stages of the disorganizing agent are traced, where otherwise it might be very difficult to suppose that the appearances are nothing else but different steps of one organic derangement. We may thus for example feel in some measure assured, that excessive contraction or atrophy of the kidney, whether with or without hardening of its substance, may be the effect of granular degeneration, and not, as *M. Rayer* seems to think, of simple chronic nephritis only. It was stated above (p. 10, *note*,) that the distinction drawn by *M. Rayer* between these two disorganizing agents is not very precise or exact. Certainly atrophy of the kidney is not a good criterion of his simple chronic nephritis. For, though he may not have met with it as the consequence of granular disorganization, it is a common enough sequela in this country. I have repeatedly seen excessive contraction of the kidney, where the urine presented during life all the characters essential to granular deposition; and in several instances I have seen one kidney thus contracted, while the other was in the middle stage of granulation, or slightly advanced in its final stage.*

---

* On comparing with my own observations the experience of *Dr Bright*, *Dr Gregory*, *M. Solon* and *M. Rayer*, as well as the more limited facts published in the Journals by other authors, it appears to me that the following appearances ought in the meantime to be distinguished, with the view of afterwards tracing their relationship. 1. Congestion of the kidnies, with or without some

The renal veins, according to *Rayer*, often present firm fibrinous clots, ramified into their branches, and occasionally adherent. The same appearance has been remarked by *Dr Osborne*. The supra-renal glands are commonly enlarged and indurated in the advanced stage. Sometimes even the fat around the kidnies acquires a firm consistence and somewhat granular structure.

There is little blood in the heart and great vessels. In one instance I could not discover a tangible drop of blood in any part of the body,—not even so much as enabled me to determine whether the blood was fluid or coagulated. The customary injections and congestions of membranous organs are in a great measure wanting; the stomach and intestines particularly are blanched; the brain,

---

granular deposit in their substance. 2. True granular degeneration of the cortical or tubular structure; a. finely granular; b. botryoidal. 3. Degeneration by a smooth homogeneous yellowish-gray mass intermediate in consistence between that of the liver and that of the brain. 4. Disseminated tubercles. 5. Induration, of semicartilaginous hardness. 6. Atrophy, with disappearance of the proper renal structure, and with, or without, one of the previous morbid states. 7. Simple Anæmia.

The last is of doubtful existence as a local affection, or independently of general anæmia; and in all probability the cases which have been considered such were really cases of anæmia with granular deposit. The six remaining varieties have been witnessed by one author or another in connexion with dropsy and coagulable urine. The question is, how they stand related to one another and to the symptoms described in the subsequent part of this work? Existing facts do not furnish the basis of a satisfactory reply: at least I have in vain endeavoured to methodize and arrange them with that view.

with its membranes, is singularly blanched and bloodless ; the body presents in short all the appearances of excessive hemorrhage,—a state which depends on the colouring matter of the blood being exceedingly defective. Urea is present very generally in the blood and serous secretions, and always where death is preceded by material diminution of the urine.

Sometimes the kidnies alone are found diseased, all the other internal viscera being apparently healthy ; of which the case of Johnston (3) is a remarkable illustration. Far more generally other organs are found to be also diseased ; and at times a very great complexity of morbid appearances is met with. These have already been specified as frequently seen after death in the middle stage ; but they are still more frequent and much more complex in the final stage of disorganization. A common concurrence is granular degeneration of the kidnies, tubercular liver, and hypertrophy of the heart ; in addition to which there is not unfrequently, either emphysema of the lungs with catarrhal effusion, or recent inflammation of some serous membrane.

No observations have yet been made on the chemical constitution of the matter deposited in granular degeneration of the kidnies, or its relations in this respect to analogous morbid deposits in other organs.

In the preceding enumeration of the morbid appearances I have intermingled such pathological views as seemed necessary, either for understanding their description, or as introductory to what follows upon the symptoms, essential and secondary. It will be more convenient to reserve for that section several other illustrations and deductions of a doctrinal nature; which are required to complete the pathology of the disease, so far as it appears at present practicable to pursue that topic to advantage.

SECTION SECOND.

SYMPTOMS AND HISTORY.

THE Symptoms of Granular Disorganization of the Kidnies may be arranged under the following heads,—local pain and other local uneasiness,—disordered digestion,—a diseased state of the urinary secretion;—a deranged state of the general circulation, together with an altered condition of the blood,—leucophlegmatia,—and a variety of secondary or incidental affections of textures and organs at a distance from the primary seat of disease, among which the most frequent are œdematous effusion into the cellular tissue, serous effusion into the serous sacs, inflammation of the serous membranes, bronchitis, diarrhœa, rheumatism, and affections of the brain. These symptoms are very variously grouped in special cases; which diversity arises in part from the disease being sometimes acute, sometimes chronic, in its origin, and partly from the exceeding number and complexity of its secondary disorders. It appears to me therefore, that the present department of the subject will be best treated of, by considering first the symptoms more or less essential of the primary disease, and then under a distinct head the collateral affections to which it may give rise.

General Symptoms.—Granular disorganization of the kidnies may commence in two forms,—as an acute, and as a chronic disorder ; but in a great proportion of cases, whatever may be its manner of commencing, it becomes sooner or later an indolent and truly chronic disease.

Acute Form.—When it appears in the acute form, it usually begins at once with symptoms unequivocal and even urgent. In such cases, generally after some decided exposure to cold, or to wet and cold together, there is a preliminary fit of chilliness or rigor, followed by feverish reaction, with its customary accompaniments of frequent hard pulse, heat and dryness of the skin, restlessness, thirst, loss of appetite, and headache. At the same time the urine becomes quickly scanty, at times almost, nay altogether, suppressed, highly albuminous, occasionally bloody, and in rare instances mingled with clots of blood. There is also for the most part frequent desire to pass urine, with at times difficulty or positive pain in discharging it,—not uncommonly dull, more rarely acute, pain in the loins, aggravated by pressure, and sometimes shooting downwards to the inside of the thighs or external parts of generation,—and more usually pain across the pit of the stomach, and in the flanks, either felt only on pressure, or increased by it, but constantly present more or less. Sickness and vomiting are of common occurrence. This train of symptoms does not continue long, seldom indeed above two days, without the supervention of others appertaining to the affections I have designated as secondary or incidental ; and of such secondary affections the most common are dropsy, especially of the limbs and face,—coma, with or without convulsions,—and acute serous inflammations, more especially pleurisy. Above all, however, dropsical effusion, in one shape or another, is seldom long absent ; and not unfrequently it puts on the characters, which, on account of the concomitant reaction and tendency to inflammation of internal organs, have obtained for it not inappropriately the name of inflammatory dropsy. It is not necessary to mention more specially at present the disorders here indicated as secondary. They will be more conveniently considered afterwards under one general head.

The subsequent progress of the disease varies much in different circumstances. Not unusually it is checked altogether under active treatment. Often enough too death is occasioned at an early period, sometimes even in four or five days, by coma or some acute serous inflammation. But most generally the symptoms of reaction merely give place to those which constitute the passive or chronic stage. It seems well established that complete recovery may take place. But in many instances the recovery is only temporary, the patient being similarly attacked in no long time; and in others again it is merely apparent, not real, because permanent organic injury has been done to the kidnies, and the urine continues essentially morbid, although for a long time there may be no other sign of a deviation from a sound state of health.

It must not be supposed that when granular disorganization of the kidnies commences in this acute manner, it always presents the complex and characteristic symptoms now enumerated. On the contrary it is more common to find dropsy or some other secondary affection developed soon after an attack of rigor, without any other interposed or concomitant symptom except scantiness and an albuminous impregnation of the urine. The true primary disease may thus for a time escape notice; and I have met with instances where it remained unknown altogether till the inspection of the dead body betrayed the condition of the kidnies, and led the practitioner to make an exact inquiry into the condition also of the urinary secretion.

There are besides many cases, where, although the disorder may appear on first examination to have begun as an acute affection, traces will be found upon minute inquiry of its having existed for several months before in a chronic form. It has begun in short in the chronic form; and the acute form is afterwards superimposed from incidental causes.

Chronic Form.—The symptoms of granular disorganization, when they put on the chronic character, may do so merely as the secondary stage or sequela of the acute affection just described. But much more generally the malady is very obscure in its origin. Often indeed, like chronic visceral derangements in general, it seems absolutely latent throughout a great part of its progress. For a long period, occasionally for many months, there is no symptom to attract the patient's notice or withdraw him from his ordinary employments; till at length gradually-increasing debility arouses his own anxiety, or the growing paleness of his complexion excites that of his friends, or the supervention of acuter symptoms, or of some secondary disorder, at once unequivocally announces the presence of disease.* Nevertheless even in such cases an attentive examination will not unfrequently show, that warnings of mischief going on were not altogether wanting, though the patient had neglected them. Thus it is not uncommon to find in cases apparently the most obscure in their origin, that the urine has been very long scanty, or on the other hand too abundant, or occasionally of a cherry-red colour from a little blood,—or that it was passed frequently and with difficulty, or with positive pain,—or that there were frequent gnawing pains in the loins or flanks, extending at times to the thighs or groins or scrotum. No single symptom of the kind now alluded to has appeared to me so invariable, or of so much service for indicating the commencement of the disease, as the fact of the patient being regularly awakened once or oftener in the night-time by the necessity of passing urine. I have scarcely ever known it wanting, where any other local symptom existed; frequently has it been present without any other for a great length of time; and it is so remarkable a deviation from the ordinary rule of health, that, although it may have been neglected, no individual can fail to recal it when his memory is tasked on the subject by his physician.

---

* A very remarkable illustration of the degree to which disorganization may advance without symptoms to attract the patient's notice occurred to me in a medico-legal case which I was requested to examine a few years ago. A woman of stout muscular form, of tolerably sound health, and somewhat given to intoxication, died not long after a squabble with her husband. Marks of contusions were found on the body, and a small clot at the base of the skull. Wishing to ascertain the state of the blood in the vessels, I examined carefully the great vessels and the heart, but could nowhere find blood enough to enable me to discover whether it was liquid or coagulated. This led me to

It is not easy to say how long or how far the malady may thus advance in more or less obscurity.

examine also the kidnies, as there was no external wound; and they were found very far advanced in granular disorganization.

Cases are often met with where many months elapse in a state of quiescence; and instances have not been wanting where the period has seemed to extend to several years. While matters remain in this position, incidental causes may suddenly develope the acuter symptoms detailed above; and more frequently the like causes give rise to some secondary disorder. The essential disease however is distinguished by the following indications. There is reduction of the strength; emaciation, not always, however, considerable; a remarkable uniformity, and commonly great paleness, yet on the other hand at times a peculiar pale-brownish dinginess, of the complexion; defective transpiration as indicated by a dry state of the skin, and the want of perspiration under exercise; often a tendency to drowsiness; often too weakness of digestion or even well-marked dyspepsia, not unfrequently attended with sickness or retching in the morning on awaking from sleep; thirst;—together with an important pathological condition both of the urine and of the blood, and sometimes one or more of the various annoyances already specified as apt to attend the discharge of urine. Of these symptoms none are invariable except the altered state of the urine and blood, with perhaps also the unhealthy complexion. The two former are not only invariable, but likewise very characteristic, and therefore of great importance; since they are alone amply sufficient to point out the true nature of the case, and will also in my opinion fix with considerable precision the state of progress of the disease. They will therefore require some detailed consideration.

State of the Urine.—The condition of the urine varies materially at different stages of the disease, but is at all times essentially morbid.

In the early stage, where the symptoms put on the acute form, the urine is sometimes natural in quantity, very rarely increased, far more generally diminished. Instead of passing between thirty-five and fifty ounces a-day, which constitute the average range of health, the patient discharges only eight, twelve, or sixteen ounces; sometimes the quantity does not exceed two or three ounces; and occasionally the secretion is altogether suppressed. The latter circumstance is very commonly of fatal import, and speedily ushers in coma with convulsions. In such cases the examination of the body after death usually confirms the observation made during life,—the bladder being found to contain either nothing but its lining mucus, or a few drops only of a liquid very little resembling urine in its sensible qualities.

Besides being reduced in quantity in this stage, the urine is also much altered in its constitution. Sometimes it presents a blood-red tint of more or less intensity: occasionally the tint is so deep as to render it opake; in a few instances clots are intermingled with it; and still more rarely the fluid discharged seems to consist of nothing but blood, which afterwards partially coagulates.* Most frequently of all, however, the colour of the urine deviates little from that of health; but in that case it is often rendered muddy or slightly opalescent by the presence of fine light particles, which do not disappear on the application of gentle heat, and consist probably of one of the modifications of the mucus of the bladder pointed out by Berzelius.—A sediment too sometimes forms when the secretion cools, which is most generally lithic acid or the lithate of ammonia, and which is redissolved at a gentle heat, lower than what is required for the coagulation of albumen. Occasionally I have observed a white sediment of the earthy phosphates; but this is exceedingly rare except as the result of alkalinity of the urine induced by long standing and consequent decay.—In general the urine froths more than usual when shaken; and on blowing into it through a tube bubbles are formed as with soapy water. This property is confined however to the urines which are loaded with albumen.—Many specimens of urine in this stage are much more prone to decay than the healthy secretion. In some I have observed a decided ammoniacal odour so soon after its discharge that in all probability decay must have commenced within the body; and frequently so much carbonate of ammonia is formed in eight or ten hours that a powerful ammoniacal odour is exhaled, earthy phosphates are thrown down in abundance, brisk effervescence is caused by acids, and another character to be stated presently, coagulation by heat, may be prevented from being developed.—The density of the urine does not differ much from the natural standard. At a later period of the disorder a very different state prevails. But in the truly incipient stage the density lies always within the limits of health. According to the most accurate investigations, those of the late *Dr James Gregory* [2dus], confirmed by the inquiries of others, and by all the trials I have myself made, the average density of healthy urine is 1024 or 1025; and a very great proportion of cases, where no temporary cause exists to occasion an increase of the watery part of the secretion, will be found to be included between the densities 1016 and 1030. In the earliest stage of granular disorganization of the kidnies the urine is commonly from 1021 to 1025, very seldom so low as 1016, unless where its quantity rather exceeds than falls short of the natural average.* This is an important character for determining the state of progress of the disease ; but, as will afterwards be seen, it cannot be applied successfully without attending to certain conditions. In applying the density as a criterion of the stage of the disease care must be taken to avoid the sources of temporary increase of the quantity of the urine. In particular the influence of diuretics should be guarded against ; and the ordinary causes of diurnal variation, such as cold, superabundance of drink, or diuretic articles of food, should be excluded by examining the first urine which is passed on the patient awaking in the morning.

---

* Care must be taken, as *Mr Rees* has suggested, not to mistake for the effects of disease the colours imparted to urine by many articles of vegetable food. Hæmaturia from other causes may be distinguished, as stated in *M. Solon's* work, by the urine ceasing to present coagulability so soon as it ceases to be red.—See Case 19. Remarks.

---

* Far too little attention has been paid by most authors to the density of the urine. French writers in particular seem to have greatly neglected it, and to have erroneous notions of its condi-

By far the most remarkable property of the urine in the present stage,—but a property which may also be presented more or less at every other stage of the disorder,—is coagulability under the action of heat and acids, owing to the presence of albumen. This is the diseased condition of the urine which has attracted most attention hitherto, as indicating the presence of granular disorganization of the kidnies. But mistaken notions have arisen in some quarters as to its precise nature and import; and it must therefore be discussed here in detail.

Healthy urine contains either no albumen, or a

---

tion and import. *M. Solon* appears to hold that the density is always greatly reduced, p. 217 ; which is certainly far from being the fact ; and no French author seems to have correct ideas of the relation which the density bears to the progress of the disease.

quantity so small, or so much altered from the ordinary properties of that principle, as to render it undistinguishable by the best chemical tests. But a variety of irritating causes may lead to an albuminous impregnation. Any cause which may occasion hæmaturia or a discharge of blood from the kidnies or bladder will of course introduce albumen into the urine. I have occasionally known a temporary albuminous impregnation produced in healthy individuals by eating freely cheese, pastry, and such other indigestible articles as are known to have in general the effect of increasing the usual solid ingredients of the urine, and occasioning a large deposit of lithic acid and lithate of ammonia. Similar observations have been made by *Dr Gregory* and by *M. Solon*. I have also repeatedly seen the same state induced for a time by a cantharides blister, when it excited the well known symptoms of renal irritation which occasionally follow its action on the skin. I have likewise met with several facts which lead to the supposition, that a state of the same kind may be brought on during the erethysmal action of mercury; and analogous observations were made long ago by *Dr Wells*. It is probable that other sources of local irritation will similarly excite an albuminous secretion from the kidnies,—as indeed is known to be excited by local irritation from almost every other texture of the body. *M. Rayer* says he has repeatedly found the urine albuminous during pregnancy. And farther it appears from the researches of *M. Solon* that in a few rare cases the urine becomes coagulable by heat, and contains albumen for a short time, during the period of crisis of some acute febrile and inflammatory diseases. It is incorrect therefore to hold, as some do, that albuminous urine is pathognomonic, or by itself characteristic, of granular disorganization of the kidnies.

But undoubtedly,—notwithstanding all the reluctance which the profession generally, and some eminent members particularly, have shown in receiving the evidence on this subject advanced by *Dr Bright* and his successors,—there is no other cause, or rather there are no other causes taken together, by which an albuminous impregnation is so often induced as by the disorder in question. I am likewise persuaded that there is no other cause whatever, which will occasion the enormous accumulation of albumen in the urine almost invariably observed in the early stage of the disease where it commences with acute symptoms. What may result from such sources of irritation as poisonous doses of cantharides, corrosive sublimate, digitalis, and some other poisons, which are known to excite even inflammation of the kidnies, with hæmaturia and diminished or even suppressed secretion of urine, I cannot pretend to say. Probably whatever urine is discharged in such circumstances will be found highly albuminous. But meanwhile we are not yet positively acquainted with any cause, much less with any natural disease, which will interfere with the general proposition, that an excessive loading of the urine with albumen is characteristic of granular degeneration of the kidnies. How it should ever have been stated, as was done by a deservedly eminent authority a few years ago, that chronic diseases of the liver give rise to albuminous urine, I am at a loss to imagine,—unless by reference to the unquestionable fact, that tubercular disease of the liver and granular disorganization of the kidnies not unfrequently concur, and to the probability that the latter disease might easily escape notice amidst the more appreciable signs of the former. For assuredly in no instance of liver disease not so accompanied, which I have had an opportunity of examining during the last nine years, have I ever found the urine to be albuminous.*

---

* It would tend greatly to perplex the reader had I entered in the text into a full examination of the various facts and statements which have been lately put forward by authors in contradiction to the general principles laid down above, as to the pathological conclusions to be formed from coagulability of the urine. But it may be right to advert more particularly to the question in a note.

Some authors seem inclined to maintain, that coagulable urine is alone a sure sign of granular degeneration of the kidneys. *Dr Osborne* in particular says in regard to dropsy: " In no instance have I met with coagulable urine without diseased kidneys, or healthy kidneys with coagulable urine." Others, qualifying this comprehensive statement, maintain, that although coagulability

The presence of albumen in such cases may be detected by various chemical tests, such as heat,

may be observed without granular disorganization of the kidneys, the occurrence is very rare. Such is the result of my own experience. Such too is the result of an express series of trials made by *M. Rayer*, who found that among 400 patients taken indiscriminately there were only three who presented coagulable urine without granular kidney. Such also is the result of a similar series of experiments on healthy persons made by *M. Solon;* who, among five or six hundred persons either in health or full convalescence, found only one with albuminous urine. Such finally is the result of another inquiry by *Professor Forget*, an author, who, as will be afterwards seen, has observed a few exceptions to the general rule. On two occasions he examined the urine of between 40 and 50 promiscuous patients in his hospital; and he found albuminous urine only in those affected with dropsy, and in whom, when they did not recover, the inspection proved the existence of diseased kidneys.

I have said enough in the text as to the occasional occurrence of albumen from temporary irritation of the kidnies during a state of health. In the present place the attention may be confined to its occurrence in states of disease.

It seems highly probable that other organic diseases of the kidney besides a tendency to granular deposition may excite a secretion of albumen with the urine. *Rayer* thinks he has found that inflammation of the pelvis of the kidney ending in suppuration,—a rare disease which he has defined and described under the name of Pyelitis,—is always attended with the discharge of albumen. *Solon* mentions that in four cases of chronic and acute nephritis, one of which ended in suppuration, he found the urine strongly albuminous. The same author mentions a case of dropsy with albuminous urine, which occurred in connexion with diseased mitral and aortic valves, and with obliteration of a great part of the cortical structure of the kidnies by cysts. Of the three cases of coagulable urine observed by *Rayer* in the examination of his 400 patients, there was none without extensive disease of the kidnies, though not always of the nature of granular degeneration. One was a case of hæmaturia in connexion with cancer and calnitric acid, corrosive sublimate, and ferrocyanate of potash; all of which separate a flaky precipi-

culus of the kidney; another was a case of inflammation of the kidney and bladder ending in purulent secretion; and the third was a case of advanced true tubercle of the kidney. I have myself once seen albuminous urine in connexion with cerebriform degeneration of the kidney; and a case has been communicated to me by my colleague Professor Syme where the same symptom accompanied excessive strumous degeneration of both kidnies. It is a familiar fact that the urine is sometimes slightly albuminous in saccharine diabetes: of which I have myself met with repeated illustrations.

It seems also well ascertained, especially by the very recent researches of *M. Solon*, that the urine is not unfrequently coagulable by one reagent or another in a variety of other diseases, where there is no evidence of the kidney being affected with any organic derangement. Such cases must be divided into two groupes; because they bear very differently upon the present question. In one comparatively rare series of cases the urine is represented to be coagulable by heat and nitric acid exactly as in granular degeneration of the kidnies. In the other series, which is of much more frequent occurrence, the urine is coagulable by nitric acid, but not by heat; which on the contrary redissolves the precipitate occasioned by the acid.

The facts belonging to the former groupe are few in number and some of them equivocal. 1. *Professor Forget*, a very candid author, mentions the particulars of two cases where the urine was found coagulable in dropsy connected with hypertrophy of the heart and obstruction of its valves, and where no disease in the kidnies could be seen. But there is some doubt whether this author was at the time exactly aware of the nature of those appearances in the kidnies which indicate the tendency to granular deposit in the early stage. From the general tenour of his paper it would appear he always looked for some degree of actual granular deposition. Now, this is not to be expected where the patient is cut off in the incipient stage: The only appearances then presented are those connected with congestion. In point of fact *M. Forget* mentions in the history of one of his cases, that the tate. But the most convenient and most conclusive are the first two, namely heat and nitric acid;

kidnies were livid.—2. *M. Solon* has given the particulars of a case where albuminous urine occurred in connexion with anasarca, bronchitis, and chronic gastro-enteritis, and where the kidnies were not diseased. I can find no objection to this fact, except that it seems to have occurred about the beginning of the period when the author's attention was turned practically to the subject; and consequently that it is possible he might not have been so conversant with the morbid appearances as to detect the less strongly defined derangements of structure which are not unfrequently presented. I can state at least, that, when the subject first attracted attention here, repeated instances came under my notice of physicians, not inexperienced in other departments of pathology, having failed to detect morbid appearances which to a more practised eye were quite apparent.—3. I must take the liberty of applying the last remark in general terms, instead of directing my criticisms in detail, to the solitary cases of the same kind with that of *M. Solon*, as well as to certain vague general statements, of a similar purport, which have been put forth by some British pathologists. The critical sifting of these facts and statements would lead to a long inquiry, which would be productive of very little profit, and which they scarcely seem to merit, considering the haste and looseness shown in advancing them. With all due deference, it does appear to me, that some of the writers alluded to would have shown more scientific prudence and candour, if, instead of publishing at once the first meagre fruits of their inexperience and scepticism, they had forborne committing themselves to an opinion, till, like *Professor Forget* in the like circumstances, they had interrogated nature with more closeness and perseverance; and then they might have found out, like him, that they had at first put a false interpretation upon the facts, or had by an unlucky accident stumbled in the first instance on a solitary exceptional case.—4. Undoubtedly the most interesting of all the examples of coagulable urine without diseased kidnies, which have yet been brought forward, are those observed by *M. Solon* in some instances of crisis in acute febrile and inflammatory disorders. Once during the hot and sweating stages, as well as the and as the present observations are intended mainly for practical purposes, it seems unadvisable to op-

apyretic intervals, of a tertian ague,—once in the desquamating stage of measles,—once in the stage of maturation of small-pox,—once about the period of encrustation in febrile pemphigus,—twice during the crisis of typhus,—once in the crisis of acute catarrh,—twice in the crisis of acute pneumonia,—and occasionally in the same circumstances in pleurisy, pericarditis, peritonitis, and gout,—he has found the urine distinctly coagulable by heat and nitric acid; and in all of these cases the coagulability was transient, disappearing as convalescence became confirmed. Facts of this kind seem to show that albuminous urine may be occasioned by other morbid actions besides that which leads to granular degeneration of the kidnies. At the same time it is fair and reasonable to throw out the query: whether,—considering that urine decidedly albuminous is a very rare concomitant of the crisis in these acute diseases,—the cases where it does occur may not actually be instances of a tendency to granular deposition, arrested along with the local and general reaction which it accompanies? The affirmative is a perfectly reasonable answer. Singularly enough, in the only two cases where I have observed coagulable urine during the crisis of acute diseases, namely in two cases of acute pneumonia, the progress of matters unequivocally proved that the patients laboured under granular degeneration of the kidnies.

The other series of cases of coagulable urine observed by *M. Solon* during the crisis of acute diseases is far more interesting and important than those just adverted to. But when properly understood, they do not in the least trench on the diagnosis of granular kidney; because the substance separated is not albumen, and is not detached by the process which all good authorities advise for detecting that principle. *M. Solon* has remarked that in a great number of instances of acute febrile and inflammatory diseases, such as ague, typhus, measles, small-pox, febrile urticaria, pneumonia, gout, rheumatism, and inflammation of serous membranes, the urine for some days about the period of crisis yields a more or less abundant precipitate with nitric acid, which disappears under the influence of heat, and which is not caused press the reader by discussing the chemical merits of any others. At a temperature a little above 160^0 F. the urine of this disease in its early stage in all circumstances, and generally too in its advanced stages, becomes turbid; and complete coagulation of the albumen gradually takes place as the heat rises to ebullition. If there is any deposit of lithic acid or lithate of ammonia, this in the first instance is dissolved, and the urine becomes clear. Muddiness from other causes, more especially from modified mucus, is not thus dissolved, however; and hence, where the muddiness

---

by heat without the acid. The source of this phenomenon cannot be albumen; the properties of which are quite different. And *M. Solon* has discovered with the aid of *M. Donné*, that the real cause is a superabundance of lithate of ammonia, which is soluble in the natural state of the urine, but is separated on the addition of nitric acid in the shape of a granular or grumous precipitate presenting before the microscope a congeries of acicular crystals. This discovery is likely to prove an important addition to our knowledge of the pathology of the fluids. But in careful hands it cannot be any source of fallacy in the diagnosis of renal diseases; neither does it at all affect the doctrines of *Dr Bright* and his followers as to the connexion between albuminous urine and granular degeneration of the kidnies.

Such seems a fair exposition of the most material facts illustrative of the occurrence of coagulable urine independently of granular disease in the kidnies. Some of them are of dubious authenticity or import, being scarcely free of the suspicion that they really were in some measure connected with the morbid action which gives rise to granular deposition. The whole of them taken together will merely show, that, besides granular degeneration, some other diseases may in a few comparatively very rare instances be accompanied by the discharge of albumen with the urine.

is considerable, it is often well to filter the fluid before testing it. When the temperature has been raised to the boiling point, the urine sometimes forms a gelatinous mass; more frequently it becomes a soft pulp like thin custard; often too, where the quantity of albumen is less, there are distinct flakes in a supernatant and separable fluid.* The earlier the stage of the disease, the more is the urine loaded with these flakes, and the more does it tend to form a pulpy or a gelatinous mass. Nitric acid acts in like manner; but it separates the albumen always in the form of flakes or pulp.

It is advisable to make use always of both tests; and this for several reasons. For first, if the urine is ammoniacal, the action of heat may be prevented even where the proportion of albumen is great. Secondly, heat alone may occasion a flaky precipitate where there is no albumen, owing to the superabundance and consequent separation of earthy phosphates,—a deposition, which nitric acid will both prevent and remove. And thirdly nitric acid alone may occasion a flaky precipitate of lithic acid; which however is redissolved by an elevation of temperature, while albumen remains insoluble. In regard to these sources of fallacy, I have to observe in the first place, that the urine should be always tested if possible before it decays and becomes ammoniacal. Because I have found that sometimes even nitric acid added in excess did not separate albumen which had been present in large quantity,—a fact which is probably to be ascribed to the albumen having itself undergone more or less decay along with the other principles of the urine. And secondly, as to the fallacy arising from the separation of earthy phosphates by heat, which was first fully and ingeniously established by *Mr Rees*,—this is a fallacy rather in the advanced stage of the disease than at the early period, with the symptoms of which we are at present occupied; for the separation of flakes of the earthy phosphates is never considerable, and cannot easily be confounded with the great mass of flaky coagulum or pulp occasioned by the presence of albumen.

---

* The best way of operating is with a tube about a third of an inch in diameter. A spoon, which many use, is a clumsy substitute, which will not show the nicer degrees of coagulability.

I may take this opportunity of observing, that it would singularly promote the future study of the disease were physicians to employ some common nomenclature for the different degrees of coagulability. Important scientific and practical conclusions might then be drawn, which at present are unattainable. I venture to propose the following as well-defined, and in practice convenient. 1. *Gelatinous by heat.* 2. *Very strongly coagulable,* where a precipitate distinctly separates by heat, and yet occupies in twenty-four hours the whole, or nearly the whole, fluid. 3. *Strongly coagulable,* where the precipitate in twenty-four hours occupies half the volume of the fluid. 4. *Moderately coagulable,* where it occupies a fourth of the fluid. 5. *Slightly coagulable,* where it occupies an eighth of the fluid. 6. *Feebly coagulable,* where it occupies less than an eighth of the fluid. 7. *Hazy by heat,* where the urine becomes cloudy, but does not form visible flakes a few seconds after being boiled. In appreciating the last degree of impregnation, it is convenient to heat only the upper half of the fluid in the tube.

The quantity of albumen is various, but always in the early stage abundant. Although proportionally great as estimated by its volume in the fluid, its weight is insignificant. Ten parts by weight in a thousand of urine will render it almost a thin uniform pulp when heated. Less than this is seldom met with in the early stage. The highest I have yet found has been twenty-seven parts in one thousand, namely in the case of Archibald Wright (case 20). Here, as in all similar instances, heat converted the urine into a gelatinous mass, from which no fluid issued on turning the tube upside down.

It is a remarkable fact that in some instances the albumen suddenly and for a time disappears from the urine. This occurrence is more frequent in the more advanced stages of the disease. But I have also at times met with the same incident, when every other symptom, and among the rest the other properties of the urine, clearly proved that the disease was only at its commencement. Of course care must be taken not to confound with such a state of the urine, a state of non-coagulability arising from alkalinity and decay,—a precaution which was observed in the cases now alluded to.

The albumen present in the urine has been supposed by some to be a substitute for the urea, which is defective; but this proposition will presently be seen to be untenable; and the only explanation which can as yet be given of the presence of albumen is, that it results from some peculiar irritation of the kidneys, which prevails during a tendency to granular deposition in its substance.

Besides containing albumen, the urine also deviates from the healthy standard in so far as it contains an unusually small quantity of its solid ingredients. This character, though presented more or less in every stage of the disease, is commonly much better marked when it is somewhat advanced, than at the commencement. But it is also in general a well-defined character from the beginning, provided attention be paid to two conditions,—first, that the natural course of things shall not have been disturbed by treatment,—and secondly, that the quantity of solid ingredients discharged by the excretion be taken absolutely, not relatively to its watery part. Even the proportion of solids relatively to the fluid part is very generally somewhat diminished; because, although the density of the urine may be so high as 1020, or even 1024, this is partly owing to the presence of the foreign ingredient albumen, and consequently when the fluid is filtered after coagulation the density falls by four, five, or even seven units. But if an account be also taken of the defect in the quantity of urine, then the absolute amount of solid ingredients excreted in the twenty-four hours is almost always, perhaps invariably, very deficient. Twelve ounces of urine, of the density 1016 after separation of the albumen, will probably constitute a fair estimate of the daily discharge in a very great proportion of cases at a moderately early stage; and this estimate infers the diminution of the daily discharge of solid matter to at least one-fourth or nearer one-sixth of the healthy average.

I have not attended much to the ratio in which this diminution affects the several ingredients of the urine. It certainly affects the urea, its chief constituent, in a full proportion. The salts appear on the whole to be diminished to a similar extent.

To conclude then these remarks on the urinary secretion in the incipient stage of granular disorganization of the kidnies,—its pathognomonic characters in this stage are a reduction, but only a moderate reduction, of density, a strong albuminous impregnation, and a material diminution of the daily discharge of solid ingredients. It will be seen afterwards how far these characters may be appealed to for directing the prognosis and for regulating the treatment.

In ascertaining the characters of the urine either as a diagnostic, or for any other purpose, a clear distinction must always be drawn between the early and advanced stages of the disease. I do not find that this distinction has been clearly defined, or at least sufficiently enforced, by any who have hitherto written on the subject. Yet no consideration has appeared of more importance, both for governing the treatment and for guiding the prognosis. When the disease is pretty far advanced, the quantity of urine is very often but little reduced below the standard of health; frequently it rather exceeds than falls short of it; and in not a few cases, where diuretics either had been long abandoned, or to the best of my information never had been administered, the amount has continued for weeks together double or so much as treble the natural quantity. I have had several patients who thus passed, so long as they continued under observation, between 100 and 130 ounces every day. In two circumstances however the quantity falls off materially,—either where incidental causes occasion acute symptoms like those which sometimes attend the early stage, more especially general reaction with a tendency to local inflammation, or to coma,—or where the granular degeneration has been allowed to go on to an excessive extent without the case being cut short, as more usually happens, by some fatal secondary affection. In the latter circumstance I have known the urine come gradually down till no more than twelve or sixteen ounces were passed daily for a long time before death; and in one very remarkable instance, [Case 3], the quantity for nine days before death did not exceed one ounce.—The colour is sometimes not very different from that of healthy urine. Much more frequently it is very pale, and in the most advanced cases so pale as to be almost colourless; not unusually it is for a time cherry-red, obviously from blood, or reddish-brown, or pale smoke-brown, all of which colours give place to mere paleness of the natural straw tint when the albumen is coagulated by heat; occasionally it presents a peculiar lemon or rather orange tint, not easily distinguished from the natural hue, but also disappearing on coagulation of the albumen.—A very common character, whatsoever the colour, is the slight muddiness also sometimes seen in the early stage, which does not disappear under a gentle heat, and is probably owing to modified vesical mucus. In a few rare cases perfect mucus is discharged in viscid strings, arising not improbably from concomitant irritation of the mucous coat of the bladder. Other deposits are not common; but I have sometimes met in this, as in the early stage, with the deposition both of lithic acid and of phosphates.—The density is invariably very much reduced. As the granular deposition proceeds, the density sinks from the standard formerly mentioned to 1016, 1014, 1012; and when the case has reached the advanced stage it is usually so low as 1010, 1008, or 1007, even where the quantity is rather under than over the natural standard. The lowest density I have ever noted where the quantity was not in excess, was 1004. In the same case I once found it 1001.5; but so very extraordinary a fact cannot be admitted without more security against accidental error from mixture of the liquid with other fluids than could be attained to upon that occasion.* A low density however is an essential character of the urine in the middle and final stages, whether its quantity be great or small; and the density goes on diminishing as the disease advances.—The urine often contains albumen, which may be discovered by the usual tests, heat and nitric acid. The amount varies a great deal more than in the early stage. Most generally it separates in a few fine flakes, which have space enough to sink and rise with the movements of the fluid as it cools, and which after rest and subsidence occupy from a fourth to an eighth part of the volume of the mass. Occasionally the proportion is far greater, not less indeed than is observed in the early stage; but in such cases, above all if the density be exceedingly low, it will be found that the patient labours under symptoms of reaction or local inflammation, and that the acute form of the disease has been casually re-induced. More frequently the albumen disappears nearly or entirely, either for a time or altogether. This happens much more commonly in the advanced than in the early stage; when the disorganization of the kidneys has proceeded far, slight haziness is all that heat or acids will occasion; and often enough no alteration whatever is produced. Even in such circumstances however the incidental recurrence of acute symptoms, attended by increased irritation of the kidnies like that which occurs often at the commencement, may cause the albumen to reappear in abundance for a time. But it is a great mistake to suppose, as some do, that the proportion of albumen in the urine necessarily increases as the disease advances. The very opposite is the general rule.[*]—

---

* *M. Solon* once met with a density of 1003; but the quantity was 44 ounces.

---

[*] Among others *M. Solon* seems to have fallen into this mistake,—not improbably, as appears to me, from his having entertained the notion that the secretion of albumen is vicarious of the secretion of urea (p. 235). I have elsewhere shown this notion to be erroneous; but the passage seems to have escaped M. Solon's observation. It may be well therefore to introduce it here. "Is the secretion of albumen vicarious of the secretion of urea? The affirmative would be a very natural supposition; but it does not accord well with all the facts. In most of the cases I have seen where the urine was very pale, of very low specific gravity, and deprived of the greater part of its urea, as in Cases 2 and 3, as well as in that of Burns, the quantity of albumen was small, never exceeding 3½ parts of dry albumen per thousand: While in the cases where the urea was considerable in quantity, as in that of Irving and Dewar, the albumen was also considerable, being in the former so high as 10 or 11 parts in the thousand. Besides, the secretion of albumen may be nearly or entirely prevented by proper treatment without the secretion of urea being restored: as is illustrated by the instances of Campbell and Irving." (Edin. Med. and Surg. Journal, Oct. 1829, xxxii. 284). My whole ulterior experience is to the same effect. Let the reader for example compare the cases of *Wright* (No. 20), in the early stage, with that of *Hutcheson* (No. 10) in the advanced stage; and he will at once see that it is impossible to suppose the albumen to be vicarious of the urea.

In searching for albumen in this advanced stage the same precautions are necessary, nay doubly so, which have been indicated above in describing the tests for it in the incipient stage. For as the proportion present is commonly small, it is on the one hand more easily suspended or decomposed by decay of the urine and the consequent formation of

It will be inferred from the text, that my own observation leads to the inference that the albumen abounds most in the early stage, decreases towards the advanced stage, and when abundant in the latter period, is so incidentally from the supervention of fresh reaction. But it must be admitted that this view does not exactly correspond with the terms in which *Dr Bright* occasionally, and *Dr Osborne*, *M. Rayer* and *M. Solon* almost uniformly, speak of the condition of the urine in advanced cases. Dr Osborne in particular expressly says that " the extent of disease discovered after death has been in every instance in proportion to the degree of coagulation," p. 22. I have been so careful in my observations upon this head, testing the accuracy of ocular inspection of the urine by repeated chemical analysis, and finding the facts regularly to arrange themselves under the general propositions laid down above, that I feel almost inclined to express a hope that these eminent authors will repeat their experiments on the relative coagulability of the urine in different stages of the disease. Should their original statements be then verified, I can see no other way of accounting for all the facts advanced by authors, than by conjecturing,—what of itself seems probable enough,—that there are several varieties of the disease, or several diseases, which, at the same stage of their progress, are attended with various degrees of the renal irritation characterized by secretion of albumen. The determination of these points,—the establishment of the exact relation subsisting between coagulability and the several degrees and varieties of morbid degeneration, can only be accomplished by ascertaining the relationship between the several forms of disease, and adopting some uniform standard of nomenclature as to degrees of coagulability, like that proposed in page 44, *Note.*

carbonate of ammonia; and on the other hand it is more easily imitated by the disengagement of earthy phosphates which sometimes takes place on the application of heat where no albumen exists. —Another invariable character of the urine in the advanced stage is a diminution of its solid contents, both relatively to its watery part, and absolutely, or discharged throughout the day. This will at once be inferred to be an essential character from what has been already said of its density and daily quantity. The total solids of the urine in a state of health I have found to be 67.7 parts in one thousand, when the density is at 1029, and the quantity thirty-four ounces avoirdupois. When the disease was far advanced, the proportion of solids has been 24 parts in one thousand, where the quantity of urine amounted to twelve ounces, and the density was 1009.5 [Francis Magee, No. 8]; and the lowest proportion I have ascertained by actual experiment was 15 parts in the thousand where about thirty-six ounces of urine were passed of the very low density of 1006.9 [Nancy Burns, No. 15]. In the latter case the total solids discharged throughout the day were reduced to one-fifth of the healthy average; and in the former nearly to one-twelfth.—It is not improbable that this great reduction may affect certain ingredients more than others. A few experiments seem to lead to the conclusion that the lithic acid and salts of the urine are more diminished at times than the urea. But this is by no means an invariable fact; neither has the difference ever appeared to me very material; so that upon the whole it cannot be included, without farther investigation, among the morbid characters of the urine. *M. Solon* seems to have found the calcareous salts peculiarly defective in the advanced stage, as no precipitate was occasioned by oxalic acid. But even where the disease was pretty far advanced, I have seen the phosphatic salts disengaged merely by decay and the consequent evolution of ammonia.

It appears then, from all that has been said of the state of the urine in the advanced stage of granular disorganization of the kidnies, that its pathognomonic characters are a great reduction in density, and an equal reduction of the daily discharge of solids,—frequently associated with the presence of albumen in small quantity. Deviations are however more apt to occur here than in the early stage; and among these the most important to be kept in view are the frequent absence of albumen, and the daily discharge of the full amount of solids owing to spontaneous diuresis. The only character absolutely invariable is great lowness of density, with of course a reduced *proportion* of solids.

In here taking leave of the qualities of the urine on which I have said so much, it may be well to make some observations on the application of them as diagnostic of the disease. Some have appeared to me to imagine that the presence of granular disorganization of the kidnies may be known by the condition of the urine alone ; and many more imagine that opinion is maintained by myself and others who have turned their attention to this branch of pathology. It is partly to correct such notions that I have dwelt so fully on the various properties of the secretion at different stages. Any one who peruses attentively what has been said will perceive, that it must be sometimes impossible to rest the diagnosis on the state of the urine alone. In general indeed we may do so with confidence. For *first*, when the disease has continued for a short time with acute symptoms, the characters of the urine, namely a somewhat reduced density, a diminished amount of daily discharge of solids, and high coagulability, are invariable, and do not occur conjunctly so far as is yet known in any other disorder. *Secondly*, there is a very common conjunction of characters in the advanced stage, which has seemed to me never to occur in any other malady, namely great reduction of density, some diminution of quantity, much diminution of the daily discharge of solids, and slight coagulability. *Thirdly*, another conjunction not less characteristic perhaps is great reduction of density, slight coagulability, and a great increase in quantity, consequently with little or no diminution of the daily discharge of solids. *Fourthly*, I have never in any circumstance, except in the advanced stage of granular disorganization of the kidneys, met with urine about the natural standard in quantity, of the very low density of 1006 or 1008, consequently defective materially in the daily discharge of solids, almost colourless, or cherry-red, or smoke-brown, or orange-yellow, and obscured by opalescent muddiness which does not disappear under rest or gentle heat,—even although not coagulable. *Fifthly*, though not absolutely prepared to state the same proposition where the quantity of urine is superabundant, and its other qualities such as those last described, I am inclined to think this condition also characteristic. But there is another condition met with occasionally which is common to this with other diseases, —namely where the quantity is natural or abundant, the density low, the daily discharge of solids natural or under the healthy standard, the colour pale-straw yellow, without either coagulability or permanent muddiness. This is a state of the urine which we observe in many diseases, and which even seems natural to some persons in good health. It is also however compatible with the presence of granular disorganization of the kidneys; and it has seemed to me to occur in one of two remarkable circumstances,—either when the disease is checked in the early stage, and a cure is going forward,—or when the disease is in the advanced stage, but has arrived at a temporary suspension of its progress.

In respect of the pathological characters of the urine as diagnostic of the disease, it seems necessary to add, that, although I feel confident of their very great value in a practical point of view in all cases, and of their being generally sufficient to direct the physician's opinion,—it would nevertheless be very wrong to rely on such a test alone, when he has it in his power to take also into account a variety of other important symptoms, among which the secondary or collateral affections are often most conclusive, and seldom entirely wanting.

State of the Blood.—Not less remarkable than the state of the urine is the condition of the blood in granular disorganization of the kidnies.

Little is yet known of the alterations of the blood in diseases. In the infancy of chemical science various theoretical statements were made regarding its changes in constitution. But since the improvements in chemistry, and more especially in the department of analysis, the researches of physicians have been confined in a great measure to such properties as may be discerned by mere ocular inspection. This apparent neglect, amidst the devotion with which other departments of pathology have been pursued, is to be ascribed not to any inferiority of the subject either in scientific interest or in direct practical importance,—but rather to the recency of the improvements in organic analysis, on which we depend for ascertaining the presence and amount of the healthy and morbid ingredients of the blood,—to the inadequate acquaintance among practitioners with even those manipulations which may be usefully applied to the daily practice of their profession, much more with those which are required for carrying on a scientific investigation,—and perhaps too not a little to the attention of pathologists having been for some years past turned almost exclusively to the more facile and at least equally productive cultivation of the pathology of the solids. Matters cannot long remain, however, in this condition. The pathological states of the solids are now so far at least known, that few inquirers will be tempted to take up the investigation of them, with the strong hope of discovery. But the pathology of the fluids, and more especially that of the blood, is little else than an untrodden region, upon which no one duly qualified can enter without the certain prospect of amassing new and interesting observations. Meanwhile however the knowledge possessed of the pathology of the blood is sufficiently meagre.

This circumstance is here adverted to chiefly because it must serve as an apology for the imperfect nature of the following sketch of the pathological condition of the blood in the disease at present under consideration. The facts adduced by me formerly,* together with those now to be detailed, seem to establish more clearly than has been done before, that granular disorganization of the kidnies induces a variety of important changes in the composition of the blood. But for want of a knowledge of the comparative alterations which that fluid undergoes in other diseases, it is not easy to see how the changes in question stand related to the affection of the kidnies themselves or to its collateral disorders. I must be satisfied therefore with faithfully indicating the facts, and adding a few statements as to the relations subsisting between the morbid conditions of the blood and the progress of the disease as well as its treatment.

---

* Edinburgh Med. and Surg. Journ. Oct. 1829.

In the early stage, when the symptoms present themselves in the acute form,—the only circumstance in which an opportunity ever occurs of examining the blood at the commencement,—that fluid very generally puts on the characters of inflammatory action: it coagulates with a thick, firm, and commonly cupped, buffy coat.—The serum is usually somewhat lactescent, and yields to sulphuric ether when agitated with it a small quantity of concrete oily matter, which seems to differ little from the fat of the cellular tissue.

The most remarkable alteration however of the serum, is a great decrease in density, together with a corresponding reduction of its solid contents. This state of the serum, which was first noticed by *Dr Bostock* in some experiments made at the request of *Dr Bright*, and which was afterwards observed also by myself in 1829, and by *Dr Gregory* in 1831, has appeared to me an invariable character in the early stage. And it farther seems to be with certain exceptions peculiar to that stage. The amount of reduction varies in different cases. It is always however very considerable,—the density, which ranges naturally between 1029 and 1031, being seldom above 1022, often so low as 1020, and occasionally even 1019, [Case 7]—and the solid contents being reduced, from 100 or 102 in one thousand, to 68, 64 or even 61. The reduction, so far as I may judge from some not very careful trials, would seem to affect equally the albuminous and the saline contents. It occurs only when there is an abundant discharge of albumen with the urine, but then invariably. On account of the loss of albumen the serum coagulates loosely when heated.*

Another not less remarkable departure from the healthy constitution of the serum is the presence of a large quantity of urea. This fact was established by some experiments published in my paper on dropsy from diseased kidney in 1829; many others since then have confirmed my observation; and I have myself had numberless opportunities of verifying it, and of settling the circumstances in which it may be with certainty observed. Urea is invariably found in the serum at all stages of the disease when the daily discharge of it by the urine is diminished materially, that is to about one-third of the natural amount. Hence it may be usually discovered in the early stage of the disease, provided the quantity of urine have not been considerably increased by incidental causes beyond what constitutes the common average at this period. But if the urine approach the healthy standard in point of quantity, and still more if it exceed that amount, urea cannot be detected satisfactorily, although still traces of its existence may be elicited. The most certain method of separating it is to evaporate the serum to perfect dryness in the vapour-bath, to boil the pulverized residue in absolute alcohol of 796, to drive off the alcohol, to dissolve the residue in water, which must be afterwards filtered through a previously moistened filter for the separation of fatty matter, and lastly to concentrate the watery solution to a small bulk, and add half its volume of nitric acid in a watch-glass. Sometimes immediately the whole mass becomes solid as it were, by the abundant crystallization of nitrate of urea; sometimes a scantier crystallization forms in a few minutes or an hour at farthest; and occasionally the only indication of the presence of urea is some effervescence, attended with the peculiar odour which accompanies the action of the acid upon this animal principle as it exists in urine. Two or three hundred grains of serum are commonly sufficient for analysis, where the urea is not in very small proportion. There has seemed to me a marked advantage in using absolute alcohol instead of the rectified spirit of the shops at 838, —the crystallization being rendered more distinctly foliaceous and more free of colour.

---

* *M. Solon* has committed the error of supposing the blood to be always deficient in its albumen. So little is this an invariable rule that the albumen is sometimes actually superabundant.—[See what is said of the composition of the blood in the advanced stage, p. 68.]

The proportion of fibrin in the blood is usually increased in the early stage. In healthy human blood I have found the proportion of dry fibrin to vary from 25 to 52 parts in ten thousand, according to the method of analysis I have generally pursued. In the early stage of granular disorganization of the kidnies I have seen it so high as 82 and so low as 30 parts. The variation has seemed to me to depend on the degree of general reaction or local inflammation which is present, and to be regulated therefore by the amount of buffiness of the blood. The proportion is accordingly often large, because at the period in question local or general reaction is not unfrequent.

The proportion of colouring matter, or hæmatosin, is little, if at all affected. An opportunity seldom presents itself for ascertaining this point satisfactorily, because the physician has it not often in his power to take blood very early in the disease, and where the patient has unequivocally enjoyed previous good health. But where these two conditions are secured, it will I apprehend be found that the hæmatosin of the blood is not reduced in amount. I am anxious to establish this proposition; because in the more advanced stages of the disease matters, as will be presently seen, are very differently circumstanced; and because the proportion of hæmatosin in the blood has appeared to me to constitute under certain conditions one of the surest criterions of the progress which the organic derangement has made in the structure of the kidneys, and therefore to be one of the most useful symptoms which the physician can attend to in a practical point of view.

According to the late researches of *Lecanu* hæmatosin constitutes on an average 1160 parts in ten thousand of the female human blood and 1325 parts in the male, in a state of health. The lowest proportion I have obtained is 1207, in a stout young woman with recent insignificant pectoral complaints; and the highest is 1535, in a powerful seaman of a revenue cutter, 32 years of age, affected for a few days with paralysis of sensation from which he speedily recovered. The mean of these results corresponds closely with what I have observed in the case of a stout man of 55, seven days after he had been seized with characteristic symptoms of granular disorganization in their acute form, while previously in a state of excellent health for five years [Archibald Wright, No. 20.] In this instance the hæmatosin amounted to 1339 parts in ten thousand. I shall presently mention other instances where the proportion approached the healthy standard; but so exact a correspondence must not be often looked for, since we seldom meet with a case so recent in a subject previously healthy, and the effect of the disease in reducing the colouring particles is prompt and energetic.

It follows then from these statements that the condition of the blood in the early stage of the disease is characterized by the low density of its serum and a defective proportion of albumen, by the frequent presence of urea, by the frequent increase of the fibrin, and by the proportion of the hæmatosin being unaffected.[*] And in order to test its characters in these respects with accuracy, the precautions to be kept in view are that the stratum of mixed serum and colouring matter may be considered as pure hæmatosin, moistened, like the fibrin, with serum, as well as simply mixed with it. The total amount of solid matter being therefore ascertained by evaporating 200 grains, the residuum was held to consist of dry hæmatosin and dry serum. The amount of dry serum was estimated from the loss sustained by evaporation, the whole water being considered to belong to serum, the solid and aqueous proportions of which were known from the previous step of the analysis applied to the clear serum; and the difference of weight, after subtracting the dry serum from the total weight of the dry mixture, gave the weight of the hæmatosin. This method of estimating the amount of hæmatosin is now generally considered accurate by the best authorities. In thus ascertaining the amount of dry serum and dry hæmatosin after the removal of fibrin, care must be taken to add to the weight of the mixture the portion of it included in the fibrin, which however is usually very scanty, and which is found by subtracting from the total weight of the blood the weight of the mixed serum and hæmatosin *plus* the weight of the moist fibrin slightly washed and squeezed.—It is not always practicable however, or at least convenient, to collect the blood in the way here explained, although it appears to me the most satisfactory method. Sometimes we must be content with operating on the blood collected and coagulated in a cup in the usual way. Here in the first instance the cup must be covered to prevent evaporation. The serum is then poured off from the clot, and both are weighed, and the solids of the serum ascertained as above. The clot is then inclosed in a small cloth, broken up, gradually squeezed till no more colouring matter drops from it, and the remaining colouring matter on the fingers, in the cloth, and in the clot, obtained by washing with water and squeezing again. The fibrin is then weighed moist, soaked, dried, and weighed as above. The difference between the total blood, and the moist fibrin and clear serum together, gives the total mixture of serum and hæmatosin, which by this method is all saved and collected, but with the addition of a little water. The dry residuum of this mixture is disease shall be really recent, not preceded, as the acute symptoms often are, by latent disorganization,—that there shall have been no marked state of precursory ill-health from other causes,—that in particular blood-letting shall not have been practised recently before,—that the urine shall be under the natural standard in point of quantity, —and that symptoms of reaction shall be present. The last two conditions are the circumstances which regulate the presence of urea, and the increase of fibrin.

---

[*] In order not to interrupt the train of statement given above, I shall here subjoin the method of analysis. On some occasions the blood was collected in a bottle containing a few fragments of lead; and the bottle, after being filled to the lip, was secured with a grooved stopper, and agitated for ten minutes. It was then weighed, to ascertain the quantity of blood made use of. The fibrin, which was all collected round the lead, was then separated, well squeezed, slightly washed, squeezed again, and weighed moist. It was next well soaked in repeated portions of water to remove the serum, which may be supposed to constitute its impregnating fluid, and lastly dried in the vapour-bath till it ceased to lose weight. This gave the amount of dry fibrin. The difference between it and the weight of moist fibrin was carried to the amount of serum.—The fibrin being removed, the colouring matter and serum were left at rest for twenty-four hours to separate. The serum was then poured off, weighed, increased by the supposed serum of the moist fibrin, and its proportion of solid ingredients ascertained by evaporating 200 grains at 212° till they ceased to lose any weight. A simple calculation thus gave the quantity of albumen and salts in the clear serum.—The subjacent

As granular disorganization advances, important changes occur in the pathological state of the blood now laid down. *In the first place* the blood usually separates into a more abundant serum and less bulky clot. The serum is commonly not so lactescent. The clot less frequently presents the buffy coat; yet this appearance is always seen whenever incidental reaction occurs; and I have also seen it well-marked in the very advanced stage, although there was neither any general reaction nor apparent local inflammation. Where the buffy coat does present itself, the clot is remarkably small and contracted; so that it sometimes forms scarcely a fourth part of the whole weight of the blood.—*In the next place* the density and solid contents of the serum, which have been shown above to be invariably much redu-

---

ascertained in the usual way, and the proportional hæmatosin and serum in it is got at by an obvious calculation.

ced in the beginning of the disease, gradually return to the healthy standard, or even exceed it. In the middle stage the serum may be often met with of rather low density, such as 1025 or 1024; and this state is always found to concur with considerable coagulability of the urine. Sometimes too, even in the most advanced stage, the density is reduced as low as it ever is at the commencement, provided incidental reaction occur and thus render the urine highly coagulable. But the ordinary course is for the density and solid contents to be restored as the disease advances; and this restoration keeps pace with the gradual diminution and disappearance of albumen from the urine. In the middle stage, when the density is about 1024, the proportion of albumen and salts of the serum amounts to 630 or 660 in ten thousand parts of blood. In the most advanced stage where there was no reaction and very little coagulability of the urine, I have seen the density of the serum 1031, and the proportion of its salts and albumen to the entire blood so high as 973 in ten thousand parts. This is above the healthy standard, which according to Lecanu varies between 780 and 800,—and according to my own experiments between 816 and 853. In the same stage, in a case where general reaction and pleurisy had supervened, the density of the serum was 1021, and the solids of the serum amounted only to 583 parts in ten thousand of the blood.—*In the third* *place*, the urea frequently disappears from the serum of the blood as the disease advances; but in the most advanced stage it commonly reappears, and it is sometimes present towards the close in larger proportion than ever. The cause of these variations is apparent: The urine in the middle stage, though defective in the proportion of solid ingredients, is often not so in the total amount of them discharged daily; because, though low in density, it is frequently increased in quantity: But as the disease draws towards a close, the quantity decreases as well as the density; and at length sometimes there is an almost total suppression. Here in short, as in the early stage, wherever there is a material reduction of the daily discharge of urea, it may be distinctly found in the blood; but not otherwise.—*In the fourth place*, the fibrin is most usually natural in its proportion after the early stage is passed, and it becomes abundant only when reaction incidentally recurs, and when the blood is decidedly buffy. In the middle stage I have found it so high as 85 parts in ten thousand of the blood, reaction being present; in the advanced stage in the like circumstance I have met with it forming 56 parts; and in both cases there was a very thick and strong buffy coat. In other circumstances it usually amounts to between 27 and 43 parts.—*Lastly*, by far the most remarkable character of the blood in the advanced stage of the disease is a gradual and rapid reduction of its colouring matter or hæmatosin. At the commencement, as already pointed out, this ingredient undergoes little or no diminution. But in the progress of time its proportion sinks; and at length it is reduced so much as to form less than a third of the healthy average. The effect of the disease in this respect is apt to be complicated with that of occasional blood-letting, which has a very great influence in reducing for a considerable length of time the proportion of colouring matter in the blood. But the reduction which takes place in granular disorganization of the kidnies is far beyond what can be accounted for by the extent to which blood-letting has been usually carried; and besides is found to be excessive where no blood had been lost at all previous to that which is analyzed. I am acquainted indeed with no natural disease, at least of a chronic nature, which so closely approaches hæmorrhage in its power of impoverishing the red particles of the blood.* It was stated above that the average proportion for the male sex is 1335 parts in 10,000; and that in the first week of the disease I had found it to be 1339 in a stout man not previously bled. In another man also of stout habit, one month ill, but once or twice previously bled, it was 1111; in another powerful man five weeks ill, and once before slightly bled, it was 1046 [Case 2;] in a stout porter, ill probably for two months, and once before moderately bled, it was 955; in a lad two months ill, and bled once

---

* A few words may here be added on the effects of frequent blood-letting upon the constitution of the blood. I have had two opportunities of ascertaining these effects in circumstances very favourable for developing them. The first was in a middle-aged woman who was bled to a small extent on account of hypertrophy of the heart and palpitation seven weeks after being dismissed from the Edinburgh Infirmary cured of a dangerous attack of pneumonia, in which she had repeatedly lost blood by venesection to a very large amount. The fibrin was 27, solids of serum 760, hæmatosin 574, water 8638 parts. With these numbers it may be well to contrast those for healthy female blood, viz. fibrin

---

25, solids of serum 816, hæmatosin 1207, water 7952. The other case, a much more remarkable one, was that of a young lady, who, before she came under my care, had been bled about fifty times in the course of four years on account of repeated attacks of pleurisy and pericarditis or endocarditis. Blood-letting became again necessary four months after the last performance of it, and while she was slowly convalescing, but was again seized with symptoms like endocarditis. The proportions in this case were found to be fibrin 44, solids of serum 938, hæmatosin 577, water 8441. These facts show that the hæmatosin is greatly reduced by frequent blood-letting,—that it is very slowly regenerated,—that the fibrin undergoes little alteration,—that the solids of the serum are quickly restored,—and perhaps too that where the hæmatosin is defective, the solids of the serum come to surpass the healthy standard. This last proposition is confirmed by what is observed where the hæmatosin is reduced from other causes. Thus in a case of chronic gonorrhœa and ophthalmia of two months standing, which had induced a general unhealthy habit, but for which blood-letting had never been previously practised, the proportions of the constituents of the blood were fibrin 57, solids of serum 995, hæmatosin 886, water 8061. And in a case of very advanced granular disorganization of the kidneys, where also blood-letting had never been previously practised, the proportions were fibrin 45, solids of serum 973, hæmatosin 427, water 8555.

before, and that recently and largely, it was 564 [Case 7;] in a gentleman six months ill, and not bled for eighteen months, when he had a severe attack of pneumonia, it was 491 [Case 14;] and in a young man ill for three months and a-half subsequent to scarlatina, and who had never been bled before, it was only 427 [Case 10.]

Thus then, in the advanced stage of granular disorganization the proportion of hæmatosin in the blood is invariably and greatly reduced; no other morbid change is invariably occasioned; but frequently the solids of the serum are also defective, sometimes on the contrary in excess; and not unoften, especially if the disorder is very far advanced, the serum likewise contains urea.

We know too little of the diseased conditions of the blood in other disorders to be able to compare with them the characters now laid down. But meanwhile it has appeared to me that the respective states which have been described to prevail, as the altered condition of the kidnies increases, may be taken as a very exact measure of the amount of the increase,—that the composition of the blood is a correct criterion, probably the most correct of all, for ascertaining the progress which granular disorganization has made, and so regulating both the prognosis, and in some measure too the treatment.

Before quitting this topic it may be of use to place in one tabular view the various analyses which have led to the preceding results, together with the most essential circumstances in the respective cases by which the composition of the blood might have been affected.

N.B.—The numbers within brackets refer to the cases in the Appendix.	Hematosin.	Dry Serum.	Fibrin.	Water.
1. Healthy young female, . .	1207	816	25	7952
2. Healthy middle-aged male, stout seaman,	1535	853	52	7562
3. Female seven weeks after copious blood-letting on account of pneumonia, . .	574	760	28	8638
4. Female four months after very frequent blood-letting during four years for inflammation,	577	938	44	8441
5. Elderly male (20), granular kidney for seven days, reaction present, urine highly albuminous; not bled, ...	1339	548 ur.	30	8083
6. Male, granular kidney for one month, a good deal bled, urine very albuminous,	1111	551	28	8310
7. Male (2), granular kidney for five weeks, very moderately bled, urine very albuminous,	1046	564	27	8363
8. Male (24), granular kidney for two months, once bled, urine considerably albuminous,	955	750	43	8252
9. Male (29), granular kidney for two months, twice largely bled, urine very albuminous, much reaction, ...	755	572	82	8592
10. A lad (7), granular kidney for two months, once recently and largely bled, urine very albuminous, reaction, . . .	564	521	62	8853
11. A lad (27), granular kidney for two months, perhaps six, never bled, urine moderately albuminous, ...	721	619	32	8628
12. A lad (10), granular kidney for three months and a-half after scarlatina, never bled, urine feebly albuminous, . . .	427	973	45	8555
13. Male (25), granular kidney for five months, perhaps twelve, never bled, reaction, urine highly albuminous, . . .	728	561	85	8626
14. Male (14), granular kidney for 6 months, much bled 18 months before, reaction, urine considerably albuminous, . .	491	583 ur.	56	8870
15. Female (17), granular kidney for 6 months, never bled, slight reaction, urine moderately albuminous, ...	916	634	34	8416

Among the symptoms directly resulting from the impoverished state of the blood the most obvious is that which, as I have mentioned above, is nearly as invariable, namely the leucophlegmatic complexion. I do not know any natural disease which so quickly or so remarkably alters the complexion. Sometimes a pale, transparent, waxy hue is gradually induced, by which a physician much accustomed to see the disease may recognize with tolerable precision those persons who are affected with it in the general wards of a hospital. At other times a peculiar dingy brownish tint is communicated, which seems to depend in general on the original complexion being dark, but is occasionally observed also where the natural complexion had been fair and florid. The latter appearance is most distinct in those who have never had dropsical effusion along with the primary disease, or who have been much affected with disorder of the functions of the stomach; and we sometimes observe the pure leucophlegmatic tint give place to the dingy brown hue in the advanced stage in those, who had been dropsical at the beginning and subsequently got rid of the anasarcous effusion. Where the countenance is somewhat puffy from œdema and the primary disease is moderately advanced, the leucophlegmatic waxiness of the complexion is most characteristically developed. Sometimes the proper pale or dingy tint is altered, either by general reaction inducing some degree of florid flushing of the face, or more frequently by obstructions to the respiration or to the action of the heart creating an obstacle to the free return of blood by the veins, and so occasioning lividity.

SECTION THIRD.

SECONDARY DISEASES.

The symptoms hitherto described as more or less essential to granular disorganization of the kidnies, namely local pain with other local uneasiness, leucophlegmatia, disordered digestion, a deranged state of the urine, and an altered state of the blood,—may exist from first to last as the only well-marked symptoms ; and the disease may consequently terminate without any complications. It is in particular by no means essential that dropsy should always accompany it, as some incorrectly imagine. Nevertheless the primary disease seldom continues long, without other important diseases being superadded, and giving occasion to a great variety of additional symptoms. These are some of them acute in nature ; and they supervene, either at the commencement or in the subsequent course of the disease, in connexion with incidental inflammatory reaction. Others, in their nature chronic, are slowly developed only after the disorganization of the kidnies has made some progress. Some of these disorders seem more or less connected with the primary disease as their exciting cause, or rather as a predisposing cause engendering the state of constitution favourable to their developement. While others seem to be simply incidental,—to concur with it by accident: that is, their concurrence is sufficiently frequent to force attention, though their relation to it as a favouring cause cannot be satisfactorily traced.

These affections, which may be conveniently called secondary, are of great consequence to the practitioner, on the one hand because it is generally through their occurrence that his attention is first directed to the real root of mischief, and on the other because they constitute in most cases a very material part of the objects of medical treatment. Some of the affections now referred to are on the whole rare. Others occur so frequently in connexion with granular disease in the kidnies, that I seldom now meet with them, and never under the character of inveteracy, without directing my attention to the urinary secretion; and it is surprising how many cases otherwise obscure in their nature are thus made at once intelligible by being discovered to be secondary to the disorder in question.

The secondary affections of most frequent occurrence are Dropsy, Diarrhœa, Pleurisy and Peritonitis, Pneumonia, Catarrh, Dyspepsia, and Chronic Vomiting, Coma with other affections of the head, Chronic Rheumatism, organic diseases of the Heart, and organic diseases of the Liver.

1. *Dropsy.*

The most frequent of all the secondary affections which occur in the progress of granular disorganization of the kidnies is dropsy of the cellular tissue or *Anasarca.* It is indeed so very generally present at one period or another of the disease that it has commonly been viewed as one of the essential symptons. But as there are few cases where it prevails throughout the whole course of the disease, as it frequently does not occur till the advanced stage, as it also often disappears for a length of time or even permanently, and as it is sometimes nearly or entirely wanting from first to last,*—there seems to be decided advantage in treating of it here at the head of the secondary or incidental affections.

It is well known that anasarca was the disorder which first drew the attention of *Dr Bright* to granular disorganization of the kidnies; and it is still the disorder which leads more frequently than any other secondary affection to the discovery of disease in these organs.

---

* Several pathologists, especially those of France, incorrectly consider anasarca an essential character of the disease. The contrary is shown as well by the experience of Dr Bright as by frequent observations in the Edinburgh Infirmary. "The disease," says Dr Bright, "may exist in all its force, and may be fatal, with its sudden and insidious attacks, without the effusion of a single drop of fluid into the cellular membrane, at any period of its course; and still more frequently will fatal instances be found, where the anasarca, having existed, has entirely ceased." [Guy's Hosp. Reports, 1836, ii.] In four of the cases recorded in the Appendix it will be seen that there was no anasarca, namely in Nos. 1, 3, 13, 18.

The light which has thus been thrown upon the pathology of dropsy can scarcely be conceived by those who have not yet attended to the subject practically, or who have been slow to admit the discoveries and propositions of *Dr Bright*. For according to my own experience, the proportion of dropsies dependant in part or wholly upon organic disease in the kidnies is, in Edinburgh, not less than three-fourths of the whole. At Strasbourg *Professor Forget* has found the proportion to be one-half.

The circumstances in which anasarca is apt to occur are not all hitherto well ascertained. When the disease begins with acute symptoms, anasarca for the most part presents itself, and that in a very few days. When symptoms of general reaction or of local inflammation break forth in the more advanced stage, anasarca is also in general speedily developed. But we do not yet know the circumstances which lead to its appearance where the disease follows its course with uniform obscurity and in the purely chronic form.

The anasarca which accompanies granular disorganization of the kidnies is commonly general. In most cases it affects the limbs in preference to the trunk and upper extremities,—merely however because the limbs are the most depending in point of position. But where the dropsical effusion is allowed to go on uncontrolled, the whole external cellular tissue becomes œdematous, even that of the face and arms; and with the aid of percussion and the stethoscope the structure of the lungs may also be often found similarly affected. Not unfrequently, where anasarca occurs in the acute form at the commencement or even in the course of the disease in the kidnies, the œdema is general throughout and from the first. In some instances in the same conjuncture it affects chiefly or even solely the face. And often enough in the young, occasionally too at a more advanced period of life, there is either nothing more than puffy œdema of the face and under the jaw; or after œdema is removed elsewhere, it remains in that quarter for a great length of time.

When the anasarca is great, there is also serous effusion into the peritoneal or pleural sacs, made evident in the former region by fluctuation, in the latter by complete dulness of the lower parts of the chest upon percussion and total absence of the respiratory murmur. But fluid very seldom accumulates in these cavities to so great a degree as when one or other of the serous sacs is singly affected from a different and local cause; ascites or hydrothorax never occurs but in connexion with anasarca,—unless in the rare cases where either is developed by the disease of the kidney through the intervention of pleurisy or peritonitis; and even where anasarca does concur, hydrothorax, dropsy of the abdomen, and also dropsy of the pericardium, never assume a very prominent character, according to my experience, unless the disease of the kidney is attended with organic disease of the heart, the lungs, or the liver.

Dropsies have been vaguely divided by symptomatologists into acute and chronic,—or active and passive,—or inflammatory and atonic dropsies. Each of these kinds may occur in connexion with granular disorganization of the kidnies; and certain forms, in particular circumstances, or with particular accessary conditions, occur only where the disease of the kidney exists. The following rules upon this point have appeared to me either invariable or so nearly universal as to deserve attention.

1. A very great proportion of cases of inflammatory dropsy depend on organic disease of the kidnies. By inflammatory dropsy I understand serous effusion into the cellular tissue, more or less acute, and attended with distinct febrile reaction, sometimes with acute visceral inflammation. Of dropsies of this kind I have not myself met with a single case during the last nine years, where there were not unequivocal signs of the kidnies being diseased. I am aware that a different statement has been made and defended by others. But the experience of all who have studied Dr Bright's writings attentively, and dispassionately applied them to practice, seems very nearly in conformity with my own: At least such is the fact in regard to the experience of all my

professional colleagues in this city with whom I have conversed on the subject. In one very remarkable variety only of inflammatory dropsy there may be some doubt whether the rule, to which my own observations lead me, will be generally found to apply,—I mean the dropsy which frequently follows scarlatina. In this variety of dropsy several observers have said they have invariably found evidence of the kidnies being diseased; while others deny this statement. On so wide a field my own opportunities have not been such as to warrant a confident opinion. I can only say, that in every case of dropsy after scarlatina which has been under my own care, and in several others as to which I have been consulted, the kidnies were affected. But it is fair to add that I have had an opportunity of once or twice examining the urine, where dropsy was conceived by other practitioners to be threatened in consequence of one of its earliest signs appearing, namely puffiness of the under eyelids; and that the urine proved to possess its natural characters. In these instances however the dropsical affection was never more unequivocally formed afterwards; and its existence at all was therefore doubtful.

2. According to my own observation all cases of anasarca where the œdematous parts do not pit upon pressure are connected with granular disorganization of the kidnies. Such cases are commonly of the nature of acute or inflammatory

dropsy. Yet they are not so necessarily; they are not invariably attended with general reaction or local inflammation. I have seen repeated instances where œdema, not pitting on pressure, and of considerable extent, concurred rather with an atonic state of the circulation. But in every case that has come under my notice since 1828 the effusion was clearly connected with diseased kidney. This however is far from being an essential character of kidney dropsy. In the majority of cases the anasarcous swelling pits readily. There seems no reason for the opinion entertained by some, such as *Rayer*, [who even goes so far as to state it among the specific characters] that the kind of anasarca which occurs in this disease is of a peculiar nature.

3. All dropsies where the urine is steadily above the healthy standard in point of quantity occur in connexion with granular kidney, except in the instances of dropsy attending the advanced stage of saccharine diabetes. The fact of an inordinate flow of urine attending a hydropic state of the cellular tissue, without diuretics, is one to which little attention has been paid by pathological writers. It is nevertheless of undoubted occurrence: nay by no means unfrequent. I have never witnessed it where the dropsy seemed to depend on diseased heart, lungs, or liver, provided the kidnies were not also affected. But I have repeatedly observed it where the effusion concur-

red with the signs of disease in the kidnies alone. I have seen the effusion maintain its ground or even increase somewhat, where the daily discharge of pale albuminous urine, low in density, and defective in urea, amounted to five, eight, or even ten pounds for weeks together, nay in one case for several months. And it is still more extraordinary, that in not a few instances of the kind the anasarca subsists or increases, though not merely the urine is abundant, but likewise the daily discharge of solids with the urine fully equals or surpasses the natural standard. Such cases are most common, as appears to me, in the middle stage of the primary disease. Few pathological phenomena are more remarkable. Yet there is an analogous fact in the production of anasarca of the limbs on some occasions in the advanced stage of diabetes mellitus, where the daily discharge of urine, and of solids with the urine, is still greater.

4. I am inclined to think,—though on this point I am not prepared to speak with confidence,—that all dropsies, where the urine, not being above the healthy standard in quantity, is also below 1010 in density, are connected with granular disorganization of the kidnies, whether the urine be albuminous or not. It need scarcely be added that this rule holds good equally where urine of such low density is also below the standard in point of quantity. It has been repeatedly stated above, that

an albuminous impregnation of the urine, indicated by the production of a flaky precipitate by heat and nitric acid, is not a necessary or invariable symptom of the kidnies being diseased in dropsy. It is not even universally present at a moderately early stage, as it often disappears for a time during that stage under treatment. And in advanced granular disorganization it is always, according to my own experience, inconsiderable, unless when reaction supervenes incidentally; and at times it is permanently wanting.

Considering the extreme frequency of dropsical effusion as a secondary disease, it may be worth while to inquire in what way granular degeneration of the kidnies may give occasion to it. On this head *M. Sabatier* has thrown out a suggestion, which has been since repeated by *M. Solon,* and which derives some support from what has been stated above as to the constitution of the blood. *Sabatier* supposes that the dropsical effusion arises simply from the increased tendency to transudation caused by the tenuity of the blood. The researches of *Magendie* show that the transudation of fluids through membranes increases with their tenuity. We should therefore expect an increased tendency to transudation in a disease which attenuates the blood so remarkably, first in the early stage by diminishing its albumen, and secondly still more in the advanced stage by diminishing its colouring matter. It will be seen from the table in page 73 that the effect of the diminution of both ingredients together is often such as to reduce the total solids of the blood to one-half the healthy proportion.

Anasarca, as an accompaniment, or secondary affection, is commonly a very important object in the treatment of the disease. For its presence in general exasperates all other secondary disorders, and the removal of it usually relieves them. There are perhaps however some exceptions. At least it has repeatedly occurred to me to remark that coma or chronic vomiting has been exasperated, or has begun to show itself for the first time, immediately on the disappearance of extensive anasarca. Dropsy is in most cases removed with tolerable certainty, though not always quickly.

2. *Dyspepsia and Chronic Vomiting.*

Next in point of frequency to anasarca, perhaps even on a par with it in that respect, is *Dyspepsia;* which at times puts on the form of *Chronic Vomiting.* Sickness and vomiting have been mentioned already among the symptoms more or less essential to granular disorganization of the kidnies. Symptoms indeed referable to weakness of the functions of the stomach are of frequent occurrence in all diseases of the kidnies. But in that now under consideration they often become so excessive and complex as to constitute truly a disease of themselves, though still obviously secondary to another disorder. In some cases the affection of the stomach puts on the characters of simple mild dyspepsia, the patient feeling sickish and heavy after meals, with perhaps also a tendency to acid or bitter eructations, and occasionally some vomiting. In others we observe the same affection, but more intense in degree, the patient still being tolerably free of uneasiness in the digestive organs, except for a few hours after meals. Not unfrequently however the disorder of the stomach approaches more closely the characters of nervous or chronic vomiting. Sickness, with occasional vomiting, early in the morning, immediately after awaking, is a common occurrence. In such cases proper dyspepsia may or may not concur, for it is not unusual to find, as in the case of No. 10, that persons subject to a good deal of sickness and some vomiting on first awaking in the morning, take their food nevertheless well and digest it comfortably, nay experience relief from taking a little food early in the day. Sometimes, on the contrary, the irritability of the stomach is very great, so that food is seldom retained, and even independently of the food there is frequent retching and vomiting. This affection adds greatly to the patient's sufferings and exhaustion. In one remarkable case, [No. 3], it amounted to the most aggravated form of chronic vomiting; for many weeks before death nothing was retained in the stomach; food, drink, medicine, were alike and immediately discharged; severe retching also frequently occurred though the stomach was empty; and death seemed to arise from mere languor and inanition.

The affection of the stomach is most frequent and most severe in the middle and final stages of the disease. It seems to be independent of general reaction or active local inflammation, and is indeed often greatest when the circulation is unusually languid, the morbid action in the kidney purely chronic, and all other organs free of acute disease. It may be frequently palliated, but is for the most part with difficulty removed.

3. *Diarrhœa.*

Another very common secondary affection is *Diarrhœa.* This affection seems in general connected merely with inordinate irritability and increased discharge of mucous secretion; but sometimes too it plainly originates in dysentery, and is connected with ulceration of the inner membrane of the intestines. It is frequently, yet not always, attended with pain in the bowels. The evacuations present considerable variety, having sometimes the appearance of the discharges occasioned by saline laxatives, sometimes again that of a turbid watery fluid with little intermixture of fæculent matter, sometimes that of broken-down fæces mixed with many small membrane-like shreds, such as occur in the middle stage of dysentery; and at other times blood is mingled with them in more or less abundance. This is sometimes a mild affection; more generally it is severe and troublesome; and often it is excessively frequent and exhausting. In a very few instances I have seen a watery diarrhœa, without pain, appear to carry off a concomitant dropsical affection, and gradually cease as the anasarca subsided [No. 28.] But this is a rare incident. Far more generally it exhausts the patient and is not followed by any good result whatever. Its causes are obscure. But it has often enough appeared to me owing to errors in diet; and in hospital practice it is clearly sometimes brought on by the watery, vegetable, and frequently acid food, which constitutes a material part of the diet of the lower orders in this city. Few articles of the treatment at least are of more consequence than to exchange the broth, beer, and butter-milk of our hospitals for an opposite diet consisting chiefly of bread, meat, and other comparatively dry and nutritive articles.

Like the last secondary affection, diarrhœa is most apt to prevail in the advanced stages of the disease. In the early stage it is not frequent and readily recedes; and brisk cathartics may be freely used without much chance of inducing a permanent diarrhœa. But when disorganization is somewhat advanced, active hydragogue cathartics are apt to bring on obstinate looseness of the bowels; and the same complaint often breaks out without any apparent exciting cause. It is commonly, and in the advanced stage of granular disorganization almost always, a very obstinate affection; sometimes no remedial measures will do more than mitigate its severity; and in not a few cases it has seemed the immediate cause of death.

It is not unworthy of remark that diarrhœa is comparatively a rare secondary affection in other cities where the habitudes of granular disease of the kidnies have been made the subject of attentive observation. *Dr Bright* informs me that it has never particularly attracted his notice in London; and both *Professor Andral* and *Monsieur Louis*, who have frequent opportunities of studying the disease in their respective hospitals at Paris, and under whose care I lately saw several well-marked cases of it, assure me that affections of the bowels have not appeared to them at all common there. Every hospital physician in Edinburgh has on the contrary been struck with the great frequency and obstinacy of diarrhœa and dysentery as secondary disorders. And this comparative fact is perhaps not the less remarkable, that diarrhœa and dysentery in general are in Edinburgh not very frequent, and the latter is seldom violent.*

---

* Though not mentioned by *M. Solon* in his general summary, diarrhœa appeared in several of his cases, which were not phthisical. It occurs likewise in the narrative of several very interest-

4. *Pleurisy and Peritonitis.*

The reverse is the case in regard to inflammation of the serous membranes, the next of the secondary affections which may be mentioned. Pleurisy and Peritonitis, which, according to the experience of *Dr Bright,* form a very prominent description of secondary disorders in London, are in Edinburgh comparatively less common. Still they are met with often enough to establish the necessity of keeping them always in view. *Solon* says they are not freuqent in France. Pleurisy is the most frequent of the serous inflammations; peritonitis is upon the whole rare; pericarditis is also seldom seen. Pleurisy is at times indicated by well-marked symptoms; but on other occasions I have seen it follow a latent course, so that, without the aid of percussion and the stethoscope it would probably have escaped attention altogether. The same observations are applicable to peritonitis.

This, as well as all other inflammations of the serous membranes, most commonly arises subsequently to some decided exposure to unusual cold and wet. It may in such circumstances occur at almost any stage of the primary disease; but it is most commonly met with near the commencement. It presents the same character of severity, and more especially of obstinacy, which granular disorganization seems to impart to other secondary

---

ing cases by *Professor Forget* of Strasbourg. *Dr Osborne* seems to have met with it often.

diseases; yet in the end it has seemed to me seldom to resist active treatment.

5. *Catarrh.*

Among the secondary affections most frequently observed in this city, *Catarrh*, both acute and chronic, but especially chronic catarrh, claims a prominent place. It is obviously often associated with confirmed pulmonary emphysema of some standing, but also frequently occurs independently of such organic derangement. That its coincidence with granular disorganization of the kidnies is not altogether fortuitous will sufficiently appear perhaps from its extreme frequency; for except in the summer months there are few cases of the primary disease without more or less of it. It appears sometimes to commence in the form of acute bronchitis or catarrh; but in by far the greater proportion of cases I have seen, namely in hospital practice, it has usually presented the characters of chronic catarrh at admission, and, so far as the histories could be trusted, it seemed to have begun obscurely and advanced by degrees, without symptomatic fever. It has always been most severe when associated with emphysema of the lungs. In such instances the symptoms have often been very urgent, the dyspnœa being severe, the expectoration profuse, the respiratory murmur strongly catarrhal, and the gorging of the lungs well-marked by dulness of percussion and absence or obscurity of respiration in the lower regions of the chest, more especially behind. It is not an uncommon cause of death where granular disease of the kidnies exists, particularly in a rather advanced stage; and it is very generally an obstinate affection. Nevertheless it is often removed by proper treatment. On the whole, however, when severe catarrh, whether acute or chronic, frequently recurs or assumes an obstinate character, the complication is unfavourable, and the patient seldom survives long, though the immediate cause of death may be some different disorder.

6. *Coma and Apoplexy.*

Among the most formidable of the secondary diseases are various affections of the head, more or less allied to *Apoplexy*. It is perhaps not quite correct to consider these affections as secondary. For, as stated under the head of the pathology of the disease, death by coma seems its natural termination, or the mode in which it proves fatal, where life is not cut short by some other affection of an incidental or secondary nature.

Drowsiness and torpor are common symptoms throughout the whole disease, from first to last. In a few rare cases sanguineous apoplexy has been developed and proved the immediate cause of death. Occasionally morbid tumours have formed within the brain as in the interesting case of Robert Irvine [No. 5.] But sanguineous apoplexy and cerebral tumours have occurred so seldom, that we cannot with confidence regard them as positively connected with the disease in the kidnies as their primary or even predisposing pathological cause.

It is very different however with another affection of the head, namely simple apoplexy, either suddenly supervening, or commencing in the form of stupor, which slowly advances to deep and imperturbable coma,—and without any commensurate or particular morbid appearance being presented within the head after death. This affection, though not among the most frequent of the secondary disorders, has yet occurred so often, that its characters are well known to all who have studied attentively the primary disease; and even the circumstances in which it is apt chiefly to appear are tolerably well ascertained. When it presents itself in the advanced stage of granular disorganization, I have most generally observed it make its approaches gradually, first in the shape of unusual drowsiness and dimness of vision, then of constant torpidity, at length of stupor, which soon passes into complete and irrecoverable coma; and more than a week or ten days may elapse between the first indications and the final issue. In the early stage of the granular disease again,—and this secondary affection may occur in the very earliest stage,—its advances are more rapid: After a short preliminary stage of drowsiness, or delirium, or both together, deep stupor is quickly formed, and apoplectic coma supervenes; which may end fatally, sometimes without convulsions, more commonly with them, and in less than two days from the first appearance of head symptoms. Of the latter course of events a good illustration will be found in the case of Robert Walker, [No 1;] and the case of Francis Magee [No 8,] will illustrate the ordinary course in the advanced stage.

Cases of this kind are very generally connected with suppression of urine. Before the drowsiness or delirium comes on, the urine becomes greatly diminished in quantity, sometimes altogether suppressed; and the secretion very seldom continues a few days in this state without comatose symptoms beginning to threaten. In relation to this statement however two facts have struck me as not a little remarkable,—namely, that on the one hand extreme diminution of urine is not essential to the establishment of stupor and coma,—and that on the other hand stupor and fatal coma are not essential consequences of an excessive diminution. On the first point I may simply observe, that I have known coma form and prove speedily fatal, where thirty ounces of urine were discharged daily up to the time of death. As to the urine becoming much reduced in amount, and that for a great length of time, without coma necessarily following,—if we look merely to the solids of the urine as the essential object of this excretion, there can be no question that for weeks together the daily discharge may be reduced to one-fourth of the natural amount, without any symptom of an affection of the head supervening. I have repeatedly witnessed such an occurrence; where moreover the analysis of the blood showed that it was loaded with urea. Farther, in one very interesting case, that of Johnston, No. 3, the patient passed no more than two ounces of light urine daily for nine days before death, yet he remained sensible to the very last minute of his existence, and died simply of inanition and exhaustion from constant vomiting of every thing he swallowed. Still the reciprocal connexion between suppression of urine and coma as a general fact cannot be questioned. Whenever the urine continues very unusually reduced in amount, and still more altogether suppressed, the supervention of coma may commonly be looked for in the course of four days; and if drowsiness comes on, while the urine is in either of these states, fatal coma is seldom to be averted.

Coma, as a secondary affection, is not necessarily connected with the extent or increase of the dropsical effusions. If the dropsical fluid be allowed greatly to accumulate, drowsiness, the first symptom of the affection of the head, very soon makes its appearance in the generality of cases; and it will speedily pass to fatal coma if not controlled. But the removal of the dropsy will usually remove the drowsiness. So far there is a frequent connexion between these two secondary disorders. But it is an important fact that coma may occur independently of any dropsical effusion, as in the case of Robert Walker, No. 1; and that on the other hand it sometimes makes its first approaches not long after the dropsical accumulation has been removed, as is illustrated by the case of Magee, No. 8.

The head affection which occurs in granular disorganization sometimes puts on the form rather of epilepsy than of apoplexy; and in some cases adverted to by *Dr Bright* the primary disease seems to have acted as a predisposing cause, inducing repeated attacks of epileptic convulsions.

Dr Osborne seems to consider arachnitis a common variety of head affection; or rather he considers the simple comatose affection I have described to be in most cases a low kind of arachnitis. This opinion however is not borne out by the numerous facts which have been observed in Edinburgh illustrative of the nature of disorders of the head. Neither in the symptoms, nor in the morbid appearances, nor in the effects of treatment, could the comatose affection so often remarked here be associated with any variety of arachnitis.

The connexion of coma and suppression of urine with granular disorganization of the kidnies is one of the most interesting facts which have been observed in its pathology. It advances us by one important step in our knowledge of suppression of urine considered as a disease. For I am persuaded, from what has been the result of the conjunct experience of the several practitioners of the Infirmary of Edinburgh for the last eight or ten years, that few cases of fatal suppression occur except in connexion with granular degeneration in its early or advanced stage; and in my own experience this connexion has been invariable. Several instances have presented themselves where the true origin of the disease was not suspected during life, but was discovered in the dead body.

It need scarcely be added that coma in the course of granular disorganization is always a most formidable affection. Its premonitory symptom, drowsiness, should always be regarded with anxiety, and attempts made to avert the threatened danger by the means to be mentioned under another Section. When the drowsiness has fairly passed into coma, a fatal result is almost inevitable.

7. *Chronic Rheumatism.*

Among the more frequent of the secondary affections may be enumerated in the next place *Chronic Rheumatism.* On this head few remarks are called for. On investigating the early history of many cases which have first come under my notice in the advanced stage, my attention has been drawn to the frequency with which reference was made to rheumatic pains as one of the previous symptoms; repeated instances of the same complication have occurred after the admission of patients into the Infirmary; and in short this connexion has appeared to me so far common, that I never meet with cases of obstinate chronic rheumatism, without being led to make inquiry into the state of the urinary secretion. The form in which it commonly appears is that of mere neuralgia, without swelling or redness of the affected parts, and seated in the muscles more frequently than the joints; but sometimes swelling of the joints may be remarked. It has not seemed to be a common complaint where dropsical effusion prevails; at least it is more generally met with where the anasarca is inconsiderable or where it has been removed; and in the latter circumstance it is more frequent than in any other. It is for the most part a troublesome and obstinate secondary complaint.

8. *Pneumonia.*

Inflammation of the lungs has not occurred often as a secondary disease among the cases observed in this city. I have seen two well-marked cases only, which are given in the Appendix, and in one of which the affection of the lungs was accompanied with pleurisy [Nos. 29, 30.] Both cases presented the same obstinacy and severity which have been mentioned as characterizing other inflammatory diseases when similarly complicated. In both however the secondary disease was removed. In two other cases pneumonia occurred in the latent form, its existence not having been indicated during life by any distinct symptoms.

9. *Diseased Heart.*

I have reserved till the last among secondary disorders the subjects of Diseased Heart and Diseased Liver,—not because they are rare, but because it is often difficult to determine how they are related to one another in point of duration. The fact is that, with the exception of anasarca, and perhaps catarrh and dyspepsia, no complication is more common than that of granular disorganization of the kidnies with enlargement and obstruction of the heart, or with enlargement and tubercular derangement of the liver, or even with organic disease in both viscera at once. All who have written on the subject agree in this ; and the ulterior experience of my colleagues and myself in the Edinburgh Infirmary completely corroborates what was stated to that purport by Dr Bright, and afterwards in my own paper, as well as by Dr Gregory. The exceeding frequency of disease of the heart in connexion with granular kidney and anasarca has even led some pathologists to doubt, whether the anasarca, which Dr Bright and his followers have ascribed to the morbid condition of the latter organ, may not really arise from organic alteration in the former. And this doubt unquestionably derives some plausibility from the fact, that the respective state of advancement of disease in the two organs, equally with the history of the symptoms throughout their progress, indicates that of the heart to be often prior in its commencement. On the other hand however the same criterions will often show as clearly that the prior disease is the affection of the kidney ; and besides there are very many cases where the affection of the kidney subsists, even in an advanced stage, without any change whatever in the structure of the heart.

The symptoms of diseased heart which most generally present themselves are increased and diffuse impulse, pulsation of its apex lower than between the fifth and sixth ribs, often too in the epigastrium, unusual extent of dulness on percussion in the præcordial region, palpitation, dyspnœa, either constant or in paroxysms like asthma, a whizzing sound after the second or first sounds of the heart,—with the usual variety of sympathetic complaints. Not unfrequently the dulness on percussion extends more to the right of the sternum than usual, and is attended with unusual sound and impulse in that quarter, and also with jugular pulsation, and tendency to lividity of the face, —a concurrence of symptoms which is seldom wanting where catarrh has long existed, more especially in connexion with emphysema. In short the symptoms referable to the heart indicate sometimes enlargement of the left side, more rarely of the right, sometimes of both ; and the enlargement is often attended with the signs of valvular obstruction.

From the exceeding frequency of enlarged heart, with or without valvular obstruction, some conceive that its concurrence is more than accidental; and this suspicion derives support from the ascertained fact that in a large proportion of cases of such concurrence, the history of the symptoms, or the relative advancement of the two organic diseases as determined by inspection after death, shows that the disease of the kidney is the prior in date. If granular disorganization does really act as a predisposing cause in exciting enlargement of the heart, the probability is, as Dr Bright points out, that this influence is exerted through the medium of the changes produced in the blood, which may act too powerfully as a stimulus to its contractions.

The conjunction of diseased heart with granular disorganization of the kidnies adds greatly to the severity and urgency of a case, more especially where the organic derangement of the heart is somewhat advanced. Of the other secondary disorders several are thus rendered much more untractable; among which may be particularly noticed catarrh and anasarca.

10. *Diseased Liver.*

The conjunction of disease in the liver is perhaps even more frequent than that of diseased heart. This conjunction is easily understood, when it is considered that granular disorganization of the kidneys, as will be seen by and bye, is one of the infirmities of the constitution of intemperance. It is often exceedingly difficult to say which of the two is prior in origin,—a difficulty which is the more felt from the frequent obscurity of the early symptoms of both. In repeated instances, however, where the diseases are conjoined, the symptoms on the one hand, or the appearances in the dead body on the other, leave no doubt that the kidnies had been affected long before the liver; and in many others the disease of the former manifestly exists alone.

It is sometimes exceedingly difficult to detect disease of the liver during the patient's lifetime. This may be the case even where the organ is considerably enlarged. For manual examination in the ordinary way, by feeling the abdomen, cannot be always applied satisfactorily, by reason of the anasarcous state of the belly; while the other ordinary signs, such as pain and tenderness across the stomach and under the right ribs, sense of weight in the latter quarter, sympathetic pains in the back, weakness of digestion, dinginess of the complexion, and the like,—symptoms which are far from being always present,—must also be considered as more or less equivocal, because they are often occasioned by disease in the kidnies alone. Important aid will often be derived in such circumstances, with a view to discover not merely enlargement, but likewise its extent, by examining the epigastrium, right hypochondrium, and lower regions of the chest by the method of percussion,—a method which in diseased liver generally is perhaps more delicate and precise than any mode of examination by merely feeling and handling the abdomen, unless where the enlargement is very considerable. The difficulty of detecting disease of the liver is much greater where the disease is not attended with enlargement. It is not uncommon to find very considerable tubercular degeneration of the liver without any well-marked enlargement. This is well known to be not an unfrequent occurrence in the tubercular liver of drunkards; and such is the form of hepatic disease which is most frequently united with granular disorganization of the kidnies. Hence it sometimes happens that, where the latter affection is well characterized, the attention of the physician may not be called to the liver at all during the life of the patient, and the first hint he receives of mischief in that quarter is the discovery of advanced tubercular destruction in the dead body.

Where the liver is extensively diseased, the ascitical effusion is commonly observed to be a very prominent affection. It is an error to suppose, as some have done, that ascites never exists in diseased kidnies without the concurrence of diseased liver.

But it is never very great without such conjunction. And hence whenever it presents itself in a considerable degree without material anasarca, wherever it remains after anasarca is removed, wherever in short ascites forms the prominent dropsical affection, there is very great probability that the liver is seriously disorganized, even though all the other usual signs are dubious.

The conjunction of diseased liver, as well as of diseased heart, with granular degeneration of the kidnies is in all probability something more than accidental. The frequency of such conjunction is perhaps alone sufficient to show that they stand in some natural relation to one another. It is not improbable too that there is some alliance in nature between the morbid depositions on the valves of the heart, in the substance of the liver, and in the structure of the kidnies, by which the organic disease in each organ is essentially constituted. There is at least a resemblance in appearance and some similarity in consistence; but I am not aware that any attempt has yet been made to discover what analogy prevails between them in other respects, more especially in chemical properties and composition. In the meantime it seems tolerably well established, that the same constitutional state, whatsoever that state may be, which favours the developement of granular disorganization of the kidnies, promotes also the formation of chronic organic disease in the liver, and of valvular obstructions of the heart.

These observations, on the mutual affinities between organic derangement of structure in the heart, liver, and kidnies, lead me to remark farther, that tubercular liver and depositions on the cardiac valves are not the only diseases in which granular disorganization of the kidnies appears in the shape of a secondary affection. It has been shown that many formidable diseases are apt to occur in constitutions invaded by the disorder of the kidnies. On the other hand this same disorder is apt to present itself in constitutions sapped by various other diseases. These it might be advantageous to inquire into in the present place. More facts however are still wanted to render the inquiry satisfactory; and the information at present possessed will perhaps be better stated under the next head, the causes of granular disorganization.

There is still one more observation to be made in respect to the secondary diseases which are apt to arise in consequence of the kidnies being affected with granular deposition. It was mentioned, in speaking of the pathology of the disease, that it seems to engender an infirmity of constitution which renders the body prone to diseases generally. This is shown by the frequency with which the kidnies are found more or less affected after death in a great variety of other disorders, although their condition may not have attracted notice during life, and although none of the more strictly secondary affections showed themselves. In particular it would appear that granular degeneration of the kidnies at a moderately advanced period of its progress renders the body peculiarly open to the invasion of some epidemic diseases. These organs have been frequently found far advanced in granular disorganization in cases of death from typhus, which for some years has been extensively epidemic in this city. And the same morbid appearance was found in a considerable proportion of the fatal cases of malignant cholera.

SECTION FOURTH.

CAUSES.

The *Causes* of most chronic diseases of the great viscera are enveloped in much obscurity. Granular disorganization of the kidnies is far from being an exception in this respect. Indeed the state of our knowledge as to its origin is hitherto so little advanced, that a methodical account of its causes must not be looked for. Nevertheless a few facts have been determined, which in themselves are not devoid of scientific interest, and in a practical point of view possess some importance.

Since in the generality of cases the disorder establishes itself silently and very gradually, its exciting cause must obviously prove for the most part inappreciable. Even where it breaks forth suddenly with well-marked symptoms and in the acute form, an adequate cause is sometimes not to be discovered. In the great majority of such cases, however, the complaint is distinctly referred by the patient to unusual exposure to cold, or to cold and wet together. Caution must of course be observed in taking for granted the reference often made by patients of their illnesses to cold in general terms. But there is no mistaking the influence of this agent in such circumstances as the following,—where for example a carter, accustomed to work chiefly in the day-time, makes several long successive journeys in the night and during wet weather,—or where a distiller, commonly employed at the furnaces, gets wet while loading carts, and sits down to his meals without changing his wet clothes,—or where a labourer, fatigued and chilled in unusually harsh weather, returns home where he has no fire to restore his warmth, but goes to bed cold and shivering. In the greater proportion of acute cases the disease is distinctly referable to some such decided exposure as those here mentioned. It is singular how often it is ascribed by patients to their having sat while overheated upon a cold stone, or to their having taken a large draught of cold water while perspiring. When it appears after exposures of this kind, it is generally preceded by a distinct paroxysm of rigors and chilliness; and anasarca shows itself within two or three days at farthest. Dr Osborne refers 22 out of 36 cases to suppressed perspiration from exposure to cold.—Where cold was not the apparent cause, I have never met with an instance where the patient could ascribe his illness to any thing else. But *M. Solon* mentions that in four of the cases which came under his notice, the cause to which the patient referred his complaints was a blow upon the loins.

In the greater proportion of cases, namely in almost all those of a chronic nature, as well as in a few where the symptoms are acute, the disease appears to be formed gradually, without any obvious exciting cause, under the influence of some depraved state of the general constitution. And even in many of the acute cases arising apparently in decided exposure to cold, it will be found on inquiry that the disease has silently originated in some constitutional cause at an earlier period; and that the recent exposure has merely superadded some acute secondary affection, or given an acute character to pre-existing essential symptoms. It is clear too from the local character of the primary disease in the generality of instances, as well as from the very peculiar nature of the morbid deposition in all, that under every circumstance there must coexist some constitutional infirmity, or otherwise some other essential predisposing cause. This circumstance, however, it must be remarked, does not exclude from the influence of the disease the constitutions of the robust and athletic. I have several times witnessed it in persons of robust habit and powerful frame; and *M. Solon* makes the same remark as to his experience. But a robust frame is not incompatible with infirmity of constitution in respect to morbid predispositions; as is familiarly exemplified in the instance of phthisis.

Of all predisposing causes none has appeared to play so important a part, in the disease which has presented itself in this city, as the constitution of intemperance. A large proportion of cases have occurred in the persons of habitual drunkards. It is not necessary however that the vice of intemperance should be carried to so great an excess; for a still larger proportion perhaps is composed of those, who, without deserving the designation of habitual drunkards, are in the constant practice of using ardent spirits several times in the course of the day, and of occasionally indulging to intoxication. I am not prepared to state the exact proportion of cases thus referable to one variety or another of intemperance; but I am certainly within the mark in stating it at three-fourths or even four-fifths of the whole. We can be at no loss to understand this connexion; since the effect of ardent spirits in stimulating the kidnies to augmented secretion is one of the most familiar facts in physiology; and in pathology no principle is better established than that the secreting organs cannot be habitually excited to over secretion for a length of time, without the risk of chronic derangements of structure being induced. That granular disorganization of the kidnies must be added to the long list of maladies, the seeds of which at least are sown by the vice of intemperance, there can be no manner of doubt. And I am strongly inclined to the belief that where the constitution of intemperance has been fairly formed, this organic disease may arise under perseverance in the evil habit, without the concurrence of any other more direct exciting cause. The resemblance between tubercular liver and granular kidney in their origin is thus rendered very striking, and the frequency of their concurrence in the same individual becomes quite intelligible.

But intemperate habits do not constitute the sole or essential constitutional condition for the developement of granular disorganization of the kidney. This plainly appears from the occasional occurrence of unequivocal signs during life or characteristic appearances in the dead body, where the most exact inquiries left no reason for questioning the assurance of the patients, that their habits were sufficiently temperate. It is true that the physician is very apt to be misled in his inquiries upon that point, more especially in the instance of hospital patients, who must constitute the chief object of his observations. But the inference against the exclusive operation of intemperance, which is derived from other quarters, is also fully borne out by the occasional, though it must be allowed, rare occurrence of the disease, at a period of life so very early as to put habits of intemperance entirely out of the question. In all such cases, and I may add in all other instances where the disease has appeared either during adolescence or in young adults, whether connected or not with intemperate habits, the individuals have appeared to me to present characteristically the peculiarities of the strumous constitution. The same connexion may be often traced in persons of middle age or advanced life by mere inspection of their physical developement; and in others, where the physical characters are obscure, the relationship may still be discovered by the presence of other strumous disorders, or a liability to them,—as for example by indolent chronic ulcers of the legs, scars indicating their occurrence at former periods, or tendency in youth to enlargement of the lymphatic glands. I have very little hesitation therefore in putting down the scrofulous diathesis among the predisposing causes of granular disorganization of the kidnies. The connexion has even at times seemed so invariable, that I have been inclined to suspect the strumous diathesis to be the prime and only essential condition, and intemperance no more than an accessary predisposing cause in any case. However this may be, there seems little doubt, that the disease is in no circumstances developed with greater certainty than where both conditions concur,—where habits of intemperance have been engrafted upon a strumous taint of the constitution.

The connexion of the disease with scrofula will probably receive farther elucidation in time, when physicians shall have diligently studied the state of the urinary secretion and of the kidnies in the several chronic maladies which are usually associated with the scrofulous diathesis. In such disorders it is reasonable to expect, if the views now thrown out be not erroneous, that coagulability of the urine during life, and granular destruction of the kidnies after death, will be presented as secondary affections. On this head the only illustration which can be advanced at present is the occurrence of the disease of the kidnies as a secondary affection in pulmonary consumption. At the moment of writing these observations I have under my care a young man in the advanced stage of pulmonary consumption, who was recently attacked with acute dropsy, and in whom, from the scantiness of the urine, its high density, and strong coagulability, it is evident that the disease of the kidnies, comparatively with that of the lungs, is in the early stage, and therefore secondary. In repeated instances I have been led by the supervention of œdema during phthisis to examine the qualities of the urine; and although the result has not been invariable, still in a great proportion of cases of the kind the secretion has been found to possess the properties essential to the renal disease. In repeated instances the diagnosis thus formed during life has been confirmed by inspection of the body after death. On divers occasions too the kidnies have been discovered on dissection in an advanced state of disorganization, where their condition had not been attended to during life, and where nevertheless, from the state of the urine left in the bladder, there could be no question that the pathognomonic characters of the disease might have been detected, had not the attention been withdrawn from them by more urgent symptoms. Of ten fatal cases where the body was examined, *M. Solon* found phthisis to concur with granular degeneration in no fewer than five. The occurrence of granular disorganization of the kidnies as a secondary disorder in pulmonary consumption is therefore undoubted. It is somewhat remarkable that the converse seems a very rare incident. I do not remember to have met with a single instance of pulmonary tubercles being formed as secondary to disease in the kidnies.

Among the predisposing, if not even among the exciting, causes may also be mentioned scarlatina. It may admit of question whether all cases of dropsy consequent upon scarlatina are connected with granular degeneration of the kidney. But there can be no doubt that such is the nature of a very large proportion of them. And from the state of the urine at different periods it is equally clear that in some at least of these cases, if not in all, the morbid state of the kidnies succeeds the scarlatina; for the urine, at first natural, has been again and again traced gradually assuming the specific characters of the granular disease, after the febrile stage of the scarlatina, but prior to the invasion of dropsy or other secondary disorders. The effect of scarlatina in occasioning diseased kidney has been ascribed to the disturbance created by the desquamation to the functions of the skin ; but this doctrine seems inadequate to account for the phenomena.

Such seems the present amount of our knowledge of the causes of granular kidney, as deduced from observation in this city. That knowledge is necessarily meagre, since the disease in general forms very gradually and obscurely. It is not at all improbable that other exciting causes besides cold may occasion it in the predisposed,—as for example, any irritating causes acting on the kidnies either suddenly and violently, or more mildly but frequently or continuously. These however still remain to be discovered. Several agents were formerly mentioned, namely, mercury, cantharides, and peculiar articles of diet, which have the property of inducing an albuminous impregnation of the urine in particular individuals. These facts were adverted to as a caution against the unreserved conclusion that albuminous urine alone will infer the presence of kidney disease. But as the foreign impregnation arises from the causes in question only in some individuals,—as instances of the kind are indeed rather uncommon,—it may fairly be made the subject of inquiry, whether they do not present themselves in those only who are by constitution predisposed to granular kidney, and consequently whether they may not be considered as instances, where the disease is threatened, and might be induced by frequent repetition of the exciting agent. I think it deserves inquiry whether the use or abuse of mercury in particular constitutions may not lead to granular disorganization of the kidnies: for I have met with a sufficient number of cases to excite a suspicion to this effect. *M. Solon* thinks humidity of the air an important cause, and refers to this source the frequency of the disease in Britain. But we have a much more satisfactory reason for its superior prevalence in the frequency of intemperate habits. Some, such as *Dr Osborne*, think that diuretics may excite it; but this seems very questionable.

It does not appear that age or sex presents any peculiar relations to this disease, or is connected with it except through the medium of the causes already specified. It is certainly more frequent in males than females, simply perhaps because the former have their constitutions more frequently undermined by intemperance, and are more subjected to the principal cause of acute attacks, —cold with atmospheric vicissitudes. I doubt however whether the difference between the sexes is any thing like what some have made it, such as *M. Tissot,* who found three males attacked for one female. Intemperance is also probably the cause why the disease is more common in middle life than at any other period. By much the greater proportion of cases occur at the time when intemperance most abounds, namely, between the ages of thirty and fifty. Yet the disease is far from being confined to that interval. Old age is not exempt from it : I had lately an old man of seventy-nine under my care who was affected with it in the middle stage, and who recovered both from extensive dropsy and from long-continued obstinate diarrhœa [No. 31] ; and at the age of sixty it is not uncommon. On the other hand it is often enough met with in early adolescence : I have twice had fatal cases at the age of seven or eight years under my observation ; in another instance at the same age complete recovery was accomplished ; and if we are to suppose that all cases of inflammatory dropsy after scarlatina depend on granular disease of the kidnies, which may be strongly suspected to be the fact, then the occurrence of this disease in infancy must be considered as a familiar event. *

The middle ranks of life would appear to be less liable to it than the lower orders, even relatively to their respective populations. The difference however may prove to be rather apparent than real ;

---

* *M. Sabatier* has met with it at the ages of five, six, seven, eight and ten years, in two of which cases it followed scarlatina. *M. Rayer* has twice met with it in children of five or six after scarlatina. *M. Martin Solon* relates an unequivocal case in an infant of eighteen months. Of 74 fatal cases *Dr Bright* found only four beyond their sixtieth year, fifty under their forty-fifth nineteen under thirty, and thirteen above fifty.

for practitioners exclusively engaged in private practice are not yet in general so well acquainted with the features of the disease as to recognize it readily in its various forms. I have lately met with it four times in the better ranks, twice subsequent to scarlatina, in a child and in a young adult, and twice in males at the ages of thirty-six and sixty, one of whom was of intemperate habits. *Dr Bright* has often encountered it in persons of the middle station of society. *Dr Abercrombie* informs me he has also repeatedly witnessed it in this class. If the disease, as seems not improbable, is really less frequent in persons of easy circumstances, the reason is intelligible: They are less exposed to the predisposing cause, intemperance, and more exempt from the exciting cause, atmospherical vicissitudes.

The same circumstances will probably be found to regulate the influence of profession. I have not a sufficient number of facts on this head to yield any practically useful conclusions. But I may mention that among twenty-six males, there were three night-watchmen, three dissipated old soldiers, three weavers, two labourers, two street-porters, a blacksmith, a distiller, a town-carter, a country surgeon, two seamen, a travelling hawker, a mason,—twenty-one in all, whose occupations subjected them either to unusual exposure or to intemperance, or to both together.

From the frequency with which old diseases of the heart are met with in people who die of granular disorganization of the kidnies I have heard some express a belief that obstructions of the circulation at its centre may be a predisposing cause. But this doctrine, if not untenable, is at all events unsupported by conclusive facts.

SECTION FIFTH.

PROGNOSIS.

THE *Prognosis* in granular disorganization of the kidnies is obviously a subject of much interest in a practical point. A chronic visceral disease of such a nature, whose essence consists of organic derangement of structure, must generally prove untractable; but it is on that account the more desirable to know in what circumstances it may be controlled, if it is susceptible of control at all. It will be advantageous to treat this subject by considering, *first*, the chance of recovery from the fundamental disease; *secondly*, the probability of recovery from those diseases which have been characterized above as secondary or incidental; and *thirdly*, the special symptoms which indicate the probability of amendment, or on the other hand of particular danger.

1. Since granular destruction of the texture of the kidnies is not merely of recent discovery, but likewise often most obscure and insidious in its origin, and very slow in its progress, it becomes

exceedingly difficult in the present state of our knowledge to pronounce whether the disease may be entirely eradicated or not.

This much appears to be established by my own experience of it, as well as that of my hospital colleagues who have studied its history attentively:—that, where the disease was clearly recent, it has been entirely removed, so far as could be judged of by the condition of the urine and other symptoms; and that the patients never returned to the hospital, though cautioned and urged to do so on the earliest reappearance of illness. Complete recovery in such circumstances is certainly not uncommon in the cases which succeed scarlatina, especially in young persons; and I have also repeatedly met with the same apparent success where the disease had no connexion with scarlatina. In other cases every symptom has disappeared except coagulability of the urine, and the individuals have continued for a long time afterwards to follow a laborious occupation in the enjoyment of tolerable health and without any material uneasiness; of which the case of Mossman [No. 29,] is a striking example. All cases however of the latter kind must be regarded with jealousy. So long as albumen continues to be secreted by the kidnies, there is reason to dread, that the peculiar action of vessels which leads to granular deposition may be going on silently; that the apparent calm is not different from the entirely latent and chronic course which the disease often runs for a great length of time from its very commencement; and that nothing is wanted but some secondary affection to point out clearly the extent of mischief which has thus secretly taken place. On the other hand, where the natural condition of the urine is restored, along with the departure of all other symptoms, I do not see that the recurrence of such symptoms after a time is to be taken for proof, as some appear to do, of the morbid action in the kidnies having never been effectually subdued. Its recurrence in such circumstances would rather appear equivalent to the returns of other diseases, such as pneumonia, bronchitis, rheumatism, dysentery and the like, which are well known to present themselves frequently in the predisposed.

That in its advanced stage, when the cortical and tubular textures of the kidnies have been invaded and partly destroyed, the disease must ever remain incurable, I need hardly say. For even though the granular deposit should be absorbed and thrown off,—of the possibility of which, moreover, there is hitherto no clear evidence,—still medical art cannot be expected to restore what has been lost of the specific renal structure. But I cannot help thinking that in such a situation some physicians are prone to entertain an unnecessarily desponding view of their patient's predicament. It has seemed to me clear, that, even where the disease has reached a pretty advanced stage in its progress, the patient may be brought by due treatment into such a condition, as to live without material uneasiness for a term of years, of which our present knowledge cannot well settle the limit, —provided he avoid improper exposure to cold, intemperance, and other irregularities in regimen. It is impossible perhaps to remove the disorganization: But its farther advancement may be checked for a time, before it has proceeded so far as to be incompatible with the enjoyment of tolerable health and comfort. Such in particular is not unfrequently the result where no other secondary disorder has fastened on the constitution except dropsy.

The case is different however, when other secondary disorders are also established, as will be seen presently under the head of the special indications of danger. A few words are in the first place required on the second head of the prognosis, namely,

2. The probability of recovery from the various incidental or secondary affections formerly enumerated.

Almost all secondary affections present the character of obstinacy when concurrent with granular destruction of the kidnies. But some show this peculiarity more than others.—*Dyspepsia*, when not severe, may generally be mitigated by ordinary treatment; but it is exceedingly apt to recur; and if severe in degree, it is with difficulty removed. Where it assumes the form of chronic vomiting, that is, where vomiting occurs independently of meals or medicine, and as the effect of morbid irritability of the stomach rather than of mere indigestion, it is always apt to be obstinate, and is sometimes unsusceptible of removal or even of mitigation.—*Diarrhœa* and *Dysentery* are always troublesome to remove, very apt to return even under regular living, and sometimes so firmly rooted as to resist all remedies and bring the patient promptly to the grave.—*Inflammation of the serous membranes*, it was stated above, has not been so common a secondary disease here as in the experience of Dr Bright in London. I have indeed had so few opportunities of witnessing it that I can say little of its characters from personal observation. Dr Bright seems to have found it often unmanageable. I have several times seen it put on the latent form; but where its symptoms have been well-marked, so as to attract attention in time, it has appeared to me to yield readily enough under proper treatment.—Every case of *Pneumonia* I have witnessed has been treated successfully.—*Chronic Rheumatism* is always a very obstinate complaint and very apt to recur where it has been removed.—*Diseased Liver* and *Diseased Heart* are as plainly beyond the reach of medical art as the organic derangement of the kidnies themselves.—*Catarrh* in its chronic form is an untractable complaint in all circumstances, and peculiarly so when it concurs with diseased kidney. It is not often, however, the immediate cause of death, though it frequently threatens to prove so. Where dropsical effusion is united with it, and has made much progress, the catarrhal symptoms, which are then always aggravated, undergo material diminution by the abatement or removal of the hydropic fluid. The spasmodic dyspnœa, which frequently attends the catarrhal disorder, is commonly relieved with effect and promptitude by the usual antispasmodics.—No secondary complaint is less under the influence of treatment than the various forms of *Coma* or *Apoplexy* which are apt to occur in this disease, and least of all that which I have designated as the most frequent, namely simple apoplexy or coma. Stupor, tending to coma, is almost the inevitable forerunner of death.—Of all secondary affections the most manageable in the generality of cases is *Dropsy*. There are few cases where we do not succeed in either removing the dropsical effusion altogether, or at least in greatly diminishing its amount; and death from simple accumulation of the effused fluid is very rare. But for the most part its removal takes place slowly,—more slowly, I believe, than in other circumstances, such as where it concurs with diseased heart. I think it is less easily, at least more slowly, removed in the early than in the advanced stage of the primary disease. Dropsy is the complaint which most frequently leads people with organic derangement of the kidney to apply for medical aid. It must be a source of some satisfaction therefore to the physician, considering the unmanageable nature of the primary complaint, that this incidental source of suffering is under his control. Although completely removed, however, it is extremely apt to return, especially where the primary disease is far advanced. I have known patients have three or four attacks of dropsy in the course of a few years.

3. As to the special indications of a favourable or unfavourable issue, the following general rules may be considered as well established.

The risk to life is by no means proportioned to the amount of albumen in the urine. The reverse indeed holds true in some measure. For where the albumen abounds, the organic derangement of structure is commonly in its early stage; and hence there is less immediate danger to life, provided the concurring incidental diseases, which in this stage are chiefly inflammatory in their nature, be actively treated. The diminution and ultimate disappearance of the albumen from the urine is a favourable sign, and is generally accompanied with marked amendment in other more tangible points. Singly however it may be a doubtful prognostic. If attended with a moderately high or gradually increasing density of the urine, whether with or without an increase in its quantity, the diminution and disappearance of albumen are favourable signs. But this will, on the contrary, rather indicate a gradual advancement of the disease, if the density of the urine should at the same time slowly decrease, especially where its quantity remains stationary. Diminution of the albumen, with increased quantity and diminished density, cannot be relied on as a prognostic on either side.

The risk is not altogether proportional, as might reasonably be supposed, to the inflammatory condition of the blood. The blood seldom presents the buffy coat so well-marked as at the commencement of the organic disease in the kidnies. Such a state of the blood clearly indicates, it is true, a greater risk of incidental local inflammations arising. But then it is, in common with such inflammations, under the control of medical art.—The danger to life may be considered material in all circumstances where the blood is greatly defective in colouring matter, provided the diminution be the result of the disease, and not of other incidental causes, such as frequent blood-letting. The decrease in the proportion of colouring matter may be held, as was formerly explained, to be a correct measure of the progress made by the disorganizing agent.—It need scarcely be added that the disappearance of an inflammatory state of the blood is a favourable sign, because there is less risk of the supervention of local inflammation.

The risk to life is not necessarily in proportion to the amount of dropsical effusion. The chance of a speedy fatal termination, either from increasing dyspnœa, or from distension, erythema, and sloughing of the legs, will indeed become very urgent where the effusion is considerable and is allowed to go on uncontrolled. The constitutional disturbance too is always greatest where the dropsy is worst; and all other secondary affections do in such circumstances put on the character of peculiar severity and obstinacy. But the dropsy, unless very excessive, is most generally within the influence of medical treatment; so that it need not of necessity excite alarm. This rule is perhaps the more to be depended on, that the greatest amount of dropsy occurs most frequently where the primary disease is only in its earliest stage; and when the dropsy is removed in that case, there is often little or nothing else wanted to restore the patient to a comfortable state of existence. In all cases the disappearance of dropsy is a favourable sign. In all circumstances this change is attended with very marked improvement of general comfort, and of most other secondary affections; and it is commonly followed, especially where the primary disease is not advanced, by a long interval of tolerably sound health.

It is right however to be also aware that removal of the dropsy does not necessarily and in all circumstances take away the risk of other incidental disorders arising and running their usual course. This rule does not apply so well where the state of the urine indicates that the organic derangement of the kidnies is far advanced. In particular, it has appeared to me not to be applicable in reference to the chance of coma or simple apoplexy supervening in the advanced stage; for in several cases this special termination actually began to develope itself soon after the absorption of the anasarcous fluid.

The patient's danger is on the whole in proportion to the lowness of the density of the urine; and the reason obviously is, that the lower the density of the urine, the farther has the organic alteration in the structure of the kidney advanced in its progress. This rule however applies only where the quantity of the urine is not materially greater than the natural average. On the other hand, it applies with peculiar force where such urine is also defective in quantity. For example, the patient may always be considered in imminent danger where the urine has a density of 1008 or 1010, and its quantity does not exceed twelve ounces daily.

In reference to this article of the prognosis, it would perhaps be preferable that physicians were to look less to the mere density and quantity of the urine abstractly, and more to these qualities as constituting a measure of the amount of daily solids excreted. It is the diminution in the daily discharge of solids with the urine that constitutes essentially the unfavourable prognostic. Nature allows of a considerable variety in respect of the discharge of solids in the urine without the health being necessarily affected. This may be remarked on studying the condition of the urine both in different individuals and in the same individual at different times. The history of the present disease shows that a very extraordinary diminution from the natural standard may take place for a great length of time, without at all events any immediate or very obvious risk to life. We see patients frequently living for many weeks in the comfortable enjoyment of tolerable health, though the amount of solid excretion by urine is diminished to fully one-third of the natural daily discharge. Seldom however does the quantity fall to one-fourth without troublesome secondary disorders forming; and any material reduction under that amount is speedily followed by urgent symptoms, most generally by drowsiness, leading on to stupor and coma.

Suppression of urine is a very fatal prognostic. Since the attention of physicians was called by Dr Bright to granular disorganization of the kidnies as a cause of suppression, I have never known a patient survive more than a few days where this symptom was fairly established; and indeed the same remark may be made in regard to the cases where the daily quantity of urine falls to three or four ounces. Diuretics in such circumstances seldom act; and unless a speedy increase take place in the quantity of secretion, stupor and coma soon supervene. I may add that many years ago, before the subject of granular kidney was understood, I met with a case of complete suppression, with acute dropsy, which must have been connected with that disease, and where recovery took place under strenuous antiphlogistic measures; but this is the only instance which has come under my notice where suppression of urine did not prove quickly fatal.

Gradual augmentation of the density of the urine, the quantity at the same time being natural, or at least not much below the natural standard, is always a propitious prognostic, and is invariably attended with visible amendment of all the other symptoms.

It is scarcely necessary to add under the head of the special prognostics, that the danger from the primary disease is invariably increased by the accession of any of the secondary disorders formerly specified. In point of fact the disease of the kidnies seldom ends fatally except through the intervention of one or another of them. The most serious secondary disorders are inflammation of the serous membranes, chronic vomiting, diarrhœa, tubercular liver, valvular obstruction of the heart, and above all coma.

SECTION SIXTH.

TREATMENT.

The *Treatment* of granular disorganization of the kidnies may be considered, first, in relation to the primary disease itself, and secondly in relation to the secondary diseases which may arise during its course. As matters stand at present, the latter of these objects is fully more important than the former,—being at all events much more frequently useful.

Treatment of the Primary Disease.

In the early stage of disease of the kidney I have stated that it may probably be arrested by proper treatment. When it attracts attention at all in this stage, it presents itself with concomitant signs of general excitement or local inflammation, or both together, and in all probability is essentially a congestive, if not an inflammatory, disorder of an acute character. In such circumstances it may be inferred that the most appropriate treatment will consist of vigorous antiphlogistic remedies. They are very often rendered imperatively necessary by the violence of the general reaction or of secondary local inflammation, such as pleurisy or pneumonia, or the like; and they would be at once resorted to on these accounts, even though the practitioner were unaware of the existence of a different and primary disease. But antiphlogistic remedies have also the best effects on the primary disease itself, as shown both by the improvement in the patient's general feelings, and by the urine altering its characters towards those which mark its healthy state.

Of all antiphlogistics the best in the early stage is general blood-letting; and in most cases it cannot be dispensed with. Where there is no contraindicating circumstance from age or constitutional infirmity, whether original or acquired, it should be regulated as to extent and repetition by the same rules which govern its employment in ordinary acute inflammations. That is, it should be carried so far in the first instance as to affect strongly the pulse and induce approaching faintness; and it should be subsequently repeated according to the state of the circulation and accompanying local symptoms. In addition to the usual means of judging upon these points, the practitioner will find great advantage in taking also into account the composition of the blood. On every occasion where blood-letting is resorted to by him for the first time, it is advisable to examine the state of the blood, more especially with a view to discover the proportion of its colouring matter or hæmatosin, and so to determine the exact progress of the structural derangement of the kidneys. For if it should thence appear that the disease is not in its early, but in its advanced, stage, and that the acute symptoms are consequently not primary, but superinduced, depletory measures must be applied with much greater caution and reserve.

When the force of general or local reaction has been subdued, or is from the first inconsiderable, local depletion is equally useful with general blood-letting. It is applied either in the form of leeches to the upper and fore part of the abdomen, or still better in the shape of cupping to the loins. It has proved especially serviceable in removing the rending pain in the loins and the dull heavy pain and tenderness in the pit of the stomach and across the flanks, which are occasionally troublesome rather early in the disease, even when the circulation is little affected.

Depletion may be considered to act most beneficially when, besides improvement in other respects, the urine returns towards its healthy constitution. Its good effects are indicated, as in the familiar phlegmasiæ, by removal of pain, subsidence of symptomatic fever, disappearance of febrile anxiety, and improved feelings of general comfort. But the best sign of all is when the urine speedily increases in quantity, loses more or less of its coagulability, and maintains or increases its density.

After depletion, general or local, has been pushed to the requisite extent, counter-irritants, in the form of blisters, issues or setons, to the loins are advisable. Up to this period the general antiphlogistic regimen, as to diet, exercise and the like, must be carefully followed; and it should in no case be relaxed till the force of the circulation has been broken. It is of particular consequence that the body shall be always warmly clothed, and diligently protected against sudden exposure to cold, but more especially to cold and wet together. On this account a general flannel dress should be constantly worn, so soon as the mitigation of the febrile heat, which is at times troublesome at the commencement, will permit.

The maintenance of the cutaneous discharge however is not to be left to warm-clothing alone. Diaphoretics may also be administered with decided advantage. *Dr Osborne* of Dublin has dwelt particularly on the necessity of this line of treatment, and on its superiority over the method by diuretics; and *Dr Bright* informs me that his experience has been to the same effect. No one indeed can question the propriety of the diaphoretic method of cure for the primary disease, especially when the violence of reaction at the commencement has been somewhat subdued. But I have some doubts, as will more fully appear by and bye, of the exactness of the doctrine lately inculcated by some that this treatment may be employed to the exclusion of diuretics altogether, not merely in the primary disease, but likewise in its secondary affections,—dropsy even not being excepted. The most efficient diaphoretic is Dover's powder in the dose of five or eight grains three times a-day. With this should always be conjoined the warm-bath every twenty-four or forty-eight hours. No other remedy gives more relief for a time, and patients who have had it once, in general importune the physician to have it repeated; so that its ultimate good effects can scarcely be doubted. It commonly occasions sweating for some time afterwards, and is followed by quiet sleep. The acetate of ammonia, which is also employed by some, has appeared to me more apt in this disease to exert its diuretic than its diaphoretic action. Dover's powder is preferable to it on another ground, being scarcely less useful as an anodyne and calmative for removing pain, and allaying irritability and restlessness. These objects however may be often attained equally well by means of extract of hyoscyamus. James's powder is also a good diaphoretic.

I sincerely wish that my experience of the effects of the diaphoretic plan could bear out the very sanguine encomiums bestowed upon it by Dr Osborne. He endeavours to show by a numerical statement, that his success with diaphoretics has greatly exceeded that of any other practitioner who has followed a different method of cure. He alleges in regard to dropsy, that he "never failed in removing it whenever the entire surface was restored to a perspiring state." And in another passage he writes in Italics that "whenever general perspiration came on, either spontaneously or in consequence of medicine, then the cases always terminated favourably." Since the announcement of his method I have often resorted to it, sometimes with evident advantage, much more generally without success; and I must likewise add, that I have several times seen general perspiration, both spontaneous, and from the use of diaphoretics, fail to produce any material relief. Still no one can question the general propriety of the diaphoretic method of cure.

Laxatives are commonly necessary, because at the commencement the bowels are either naturally constipated, or become so under the constant use of Dover's powder; and no laxative in general answers better than the compound colocynth mass with half its weight of extract of hyoscyamus. Brisk purgatives may be occasionally used in aid of other antiphlogistic remedies; but they should not be repeated too frequently, otherwise a troublesome obstinate diarrhœa may be induced, which was formerly stated to be a frequent secondary affection in this disease, and one which ought to be avoided or checked in most circumstances.

In certain secondary affections, however, more especially in dropsy, or when coma threatens, the consideration now stated must be frequently disregarded, because active cathartics may often prove the only effectual remedies for averting the more pressing secondary evil.

These are the chief available measures for arresting the primary disease of the kidnies in its early stage. In the event of their proving successful, they must be followed by rigorous prophylactic measures for preventing a relapse. Among these the most important are warm clothing and careful protection against cold and damp, nutritive food of easy digestion and not in excess, abstinence from spirituous liquors, with the temperate use of wine, regular brisk exercise, and occasional warm-bathing,—in short all such means as may best contribute to promote the cutaneous transpiration, and moderate the demand upon the function of the kidnies.

Among the remedies which have been employed in the early stage of granular disorganization of the kidnies the best authorities now agree in discarding diuretics. To this doctrine, but with certain limitations, my own experience leads me likewise to accede. During the state of general reaction usually prevalent in the cases which are detected in this stage, diuretics do not readily excite their proper action; and the urine is restored to its healthy amount with much greater certainty by subduing reaction, that is, by the antiphlogistic measures already mentioned. Besides, it may be fairly asked what precise purpose is to be served by the induction of diuresis with internal remedies, so far as regards the primary disease. It does not appear very evident in what way diuresis brought on artificially will lessen the tendency either to inflammatory action, or to albuminous secretion, or to morbid deposition. But farther, some late authors have plausibly argued that diuretics are even positively hurtful, because by their stimulus they add to the irritation which already exists, and thus actually increase, instead of diminishing, the tendency to morbid secretion and nutrition. One of these, *Dr Osborne*, has carried his distrust of such remedies so far as to assert that they may actually produce the disease.

Here however it appears to me that the argument has been pushed too far, and to the establishment of a serious practical error. It does not follow, because diuretics by their stimulus cause increased flow of natural urine, that they will also cause an increase of morbid secretion. The irritation which excites the former may be different from that which excites the latter. That they really are different in kind would appear probable, as well from the extreme difference of their products, as from the fact that diuretics, when they increase the flow of urine in this disease, very rarely, so far as I have observed, increase the albumen, which in the early stage may be held to be a correct measure of the degree of morbid irritation. I have even repeatedly seen the albumen disappear under diuretics. But, if the two irritations be different in kind, we may infer from numberless parallel instances in regard to inflammation and irritation in the organs and textures of the body at large, that the one may be induced, without necessarily increasing, nay possibly enough with the effect of diminishing, the other. Theory therefore is not at variance, as some imagine, with the employment of diuretics in granular disease of the kidnies. Neither for my own part have I had occasion to observe any distinct facts which would lead to a conclusion in any way different. Diuretics, I repeat, do not increase the coagulability of the urine in the early stage: In many instances they seem to diminish it. In the advanced stage there are no easy and sure criterions for judging of the progress of the primary disease; but so far as one may judge, it does not appear that disorganization at this period is promoted by the operation of diuretics.

The views here discussed seem called for,—not because I would infer that diuretics are positively useful, and ought to be resorted to, in respect of the primary disease, whose treatment is alone under consideration at present,—but because the unnecessary dread of an evil influence from them over the primary disease has led several estimable authorities to forbid their employment likewise in all secondary affections, in some of which no other remedies are so promptly efficacious, and where such experience as I have had would justify the belief that they may be made use of with perfect propriety.

Another remedy which has been proscribed in this disorder is mercury. Mercurial action, by reason of its familiar power in subduing inflammation and removing glandular obstructions, might have been considered with justice as not inapplicable. But the experience of *Dr Bright*, confirmed by all who have followed his footsteps, has shown that mercury is of no service in the primary disease, that the constitution is frequently in that state in which the effect of mercury on the mouth is developed with extreme facility, and that this effect when once induced is apt to be uncontrollable and violent. Frequent observation has satisfied me on the whole of the truth of all these propositions. Yet there seems no sufficient reason for carrying the prohibition of mercury so far as to exclude its use in small doses for aiding the action of other remedies, such as diuretics and cathartics. When employed thus moderately, it has seemed to accomplish the purpose in view without any particular risk of the unexpected developement of its erethysmal action; and when its effects on the mouth have been produced during such cautious employment, they have not appeared to me, as they have done to others, particularly unmanageable. *M. Solon* alone, of all the authors on this subject, recommends mercury as a remedy for checking the primary morbid action. But there is no evidence of its possessing any such property.

When granular disorganization of the kidnies has attained the middle or advanced stage, or where it puts on the chronic form from the commencement, there is little room for active treatment. The physician can scarcely hope to eradicate it. Experience has not hitherto taught him any means of promoting the removal of the morbid deposit; and it would be absurd to expect to restore in any circumstances that portion of the natural structure of the kidnies which has been gradually encroached on and destroyed. Still however observation has satisfactorily proved, that in this condition much may be done for improving the general health and prolonging life. Repeated instances have shown, that there is no incompatibility between a rather advanced state of disorganization of the kidnies and the enjoyment of tolerable health and comfort. For this end a provision seems to be frequently made by a spontaneous increase in the quantity of urine; so that the daily amount of solid secretion through that channel is maintained about the natural standard. Yet such provision is not indispensable; for cases are observed where health and general comfort are preserved for a considerable length of time, although the diminished density of the urine is not compensated by any material increase in quantity. Two conditions are essential for the continuance of this state,—on the one hand, the arrestment of the progress of disorganization,—and on the other the removal and prevention of secondary disorders.

That the progress of degeneration may be arrested for a long period, or at all events rendered exceedingly slow, is evident from the history of various cases which have come under my observation. Putting aside other less unequivocal illustrations, I may instance the case of Mossman, [No. 29,] in whom the disease was brought under observation at a rather early stage, and who for two years and a-half has led an active life, and in the possession apparently of sound health, the urine continuing low in density and loaded with albumen, and in both respects exactly to the same degree as when he ceased to be under medical superintendence. I may also mention that an elderly gentleman, in whose case I was consulted five years ago, and who had then extensive anasarca, with severe dyspnœa and catarrh, as secondary affections, was cured of these complaints, and has since enjoyed very tolerable and uninterrupted health. These statements correspond with the opinion of *Dr Bright*, who says in his latest observations in Guy's Hospital Reports for 1836, that with care life may be prolonged many years, and without care is materially shortened.

The treatment for arresting the progress of disorganization consists chiefly in regulating the diet and regimen so as to avoid both unusual irritation of the kidnies, and likewise the several causes which are apt to excite any of the secondary diseases. The maintenance of the cutaneous transpiration by warm clothing, the avoidance of alternations of temperature, the occasional employment of the warm-bath, and the enforcement of regular active exercise, are the most important articles of the treatment; and next may be mentioned regularity and moderation as to food and drink, which are to be secured by a reduction of the amount of food if the patient belong to the middle ranks of life, by the selection of such articles as are both nutritive and easily digestible, probably by observing a preponderance of vegetable food, and certainly by entire abstinence from spirituous liquors as well as the sparing use of wine. By such means there is some hope of arresting the progress of structural derangement in the kidnies. By the same means too we may best secure the prevention of secondary disorders, which has been stated as part of another condition for the maintenance of health. The remaining part of that condition, the removal of such secondary disorders as do make their appearance, is to be attained by a different set of measures, which must now be taken into consideration.

Treatment of the Secondary Affections.

I have in the course of the previous observations repeatedly enforced the necessity of diligently studying and carefully watching the several secondary diseases which may occur incidentally in the progress of granular degeneration. They are the principal sources of danger. They are the chief causes of discomfort. And if they can be successfully warded off or removed, the primary disease will often for a very long time give rise to little uneasiness.

Their treatment is in many respects identical with that which is resorted to for the removal of the same disorders in ordinary circumstances, that is, when they are primary in their nature. But nevertheless several particulars deserve mention, in which the employment of the usual remedies is subject to important modifications, or must be governed by peculiar rules.

It may in the first place be remarked of almost all of them, that they are exceedingly apt to arise under exposure to cold, producing in all probability impaired transpiration; and consequently that in most of them advantage will be found in keeping diaphoreties as much in view as possible in the course of the treatment. This rule has been strongly enforced by *Dr Osborne* on theoretical considerations, as well as on the ground of actual success; and, although my own observation leads me to fear he may have interpreted that success too favourably, the rule appears to be one to which it is impossible to find an objection. Each disorder will besides call for its own special remedies.

1. The first secondary affection in importance with a view to the treatment is *Anasarca.*

When anasarca presents itself in the acute form, as not unfrequently happens, and almost invariably when it occurs in the early stage of the primary disease, the same treatment must be applied with that which has been for some years generally adopted in Britain for the cure of what is called Inflammatory dropsy. That is, free blood-letting must be resorted to, exactly as has been already recommended for the primary disorder in the kidnies. This is indeed an essential remedy in the anasarca which appears, either in the early stage or afterwards, in concurrence with general reaction or signs of local inflammation. Without it, little or no impression will be made on the anasarcous effusion by any other means. The amendment that ensues is commonly great and speedy. The local pains, and general uneasiness subside, and the dropsical swellings often fall very materially in a single night, sometimes with increased flow of urine, at other times without augmentation either of this or of any other appreciable secretion. The propriety of repeating the blood-letting will depend on the impression made at first on the symptoms, upon the stage of the primary disease, and on the age and constitution of the patient. Occasionally it must be repeated again and again as in cases of local inflammation; and I may observe that, provided the primary disease be in the early stage, there is more risk of error from too sparing than from too liberal depletion. The correct guides for regulating it are the state of the pulse, the local pains, the breathing, the temperature of the skin, and the general feelings of the patient. The presence of the buffy coat cannot be trusted to as an index of the propriety of further depletion; for a highly buffy state of the blood often occurs where no particular excitement prevails, or may continue after excitement is effectually subdued. When blood-letting is found necessary for acute dropsy in the advanced stage of the primary disease, it must be employed with a more sparing hand. Nor is liberal depletion called for in such circumstances; since a moderate loss of blood produces for the most part a powerful impression on the principal symptoms.

When the general excitement has been effectually repressed by blood-letting, or in the frequent cases where dropsy occurs without general or local reaction, the anasarcous accumulations must be removed by other measures; and the choice lies between diaphoretics, diuretics and purgatives. By one or another of these remedies we seldom fail in diminishing or even removing entirely the dropsical effusion; but the progress of the cure is often very slow.

Diaphoretics have been lately much commended and preferred by some good authorities, first by *Dr Osborne*, and more recently by *Dr Bright*, on the ground of their actual efficacy, and on the supposition that diuretics, which were previously in use, prove injurious by promoting the primary disease. Reasons have already been assigned above for doubting the accuracy of the latter notion. As to the efficacy of diaphoretics in removing the dropsical effusions, I cannot say that these remedies have produced in my hands the good effects which would have been expected from the experience of others, more especially of *Dr Osborne*. I have very seldom witnessed decided diminution of the dropsy, unless where diuretics or purging was either artificially induced at the same time, or arose spontaneously. The diaphoretics employed were principally the solution of acetate of ammonia, Dover's powder, warm clothing, and the warm-bath. The first of these, as formerly mentioned, has seemed prone to act rather upon the kidnies than upon the skin. It has appeared to me that the most undoubted advantage is remarked, where both diaphoretics and diuretics are given to such an extent as to produce the proper physiological action of each set of remedies.

The removal of the dropsical accumulations is commonly accomplished with more speed and convenience by Diuretics than by any other treatment. A great variety of diuretics have been made use of. But I am still inclined to give the preference to those originally recommended by Dr Bright, and afterwards in my own paper upon this disease, —namely digitalis and cream of tartar. Digitalis however has not seemed a very certain diuretic in the anasarca which accompanies granular kidney, unless it be given along with other remedies of the same action. Cream of tartar again, though one of the most certain of them, does not seem to produce steady and lasting diuresis so readily as when united with vegetable diuretics. And no combination which I have tried combines both advantages in such a degree as digitalis and cream of tartar together. The former was usually given in the dose of one or two grains of the powder in the form of pill thrice a-day, or in the dose of ten, fifteen, or twenty minims of the tincture three times daily in a little distilled water of cinnamon or cassia. The cream of tartar was administered thrice a-day in the quantity of a drachm and a-half or two drachms with about five ounces of water. Diuresis may generally be induced by such means in the course of three or four days, sometimes sooner,—seldom, however, if delayed beyond the seventh day. I cannot comprehend why it should be said by some that this method seldom succeeds at all in exciting diuresis. Occasionally it appears to be promoted by giving also a mercurial pill every evening for four or five days, which may be omitted soon after the flow of urine increases, in order to avoid the risk already adverted to of the constitution being extremely sensible to mercurial action. Where diuretics had been given for some time without effect, I have sometimes seen their action suddenly developed by the administration of an emetic of tartar-emetic and ipecacuan. Still more frequently have I seen it brought on in the same circumstances by a single dose of some hydragogue cathartic, such as gamboge. If all these means fail, and it should still be thought advisable to persevere with the diuretic method, the powder of squill may be tried, or infusion of broom-tops, or spirit of nitric ether, or hollands with water, or carbonate, nitrate, or acetate of potash. All of these diuretics are occasionally found to succeed, where the means already mentioned fail; but none of them is at all equal in energy and certainty to digitalis and cream of tartar. Sometimes, instead of inducing diuresis, the cream of tartar acts as a hydragogue cathartic. To this in general there is no objection; because it operates mildly, though effectually, and with no less influence over the dropsical swellings than through means of its diuretic action. But its cathartic action is unsafe where there exists a tendency to obstinate diarrhœa, which has been enumerated among the troublesome or dangerous secondary disorders. In such circumstances it may be necessary to check or prevent its operation on the bowels by the regular use of opium; and occasionally it cannot be safely persevered with in any manner.

When diuresis is once established, it may very often be maintained almost indefinitely by digitalis alone in the dose of ten or fifteen minims of the tincture daily. Repeatedly too I have had occasion to observe, that when it has been brought on and maintained for some time by artificial means, it will go on naturally for a long period,—even till the entire removal of the dropsical effusion, or still longer.

The effect of diuresis in removing dropsical effusion in this disease is frequently very slow. It has appeared to me more rapid in the advanced than in the early stage of the disease.

The Purgative method of removing anasarcous effusion is now less in vogue than formerly, by reason of the superior convenience of the diuretic plan. In the anasarca too which attends diseased kidney it is sometimes excluded by the presence of an exhausting obstinate diarrhœa, which has no effect in reducing the effusion. But the prejudice against purgatives is carried by many a great deal too far; and by some their action in dropsy seems not to be thoroughly understood. That they are often most efficacious, and this where diuretics have failed, will be doubted by no one who has frequent recourse to them. They are very often by no means so inconvenient in their operation as many imagine; for even drastic cathartics, such as gamboge, although they produce severe griping and exhaustion in ordinary circumstances, seem in most instances free from this objection where they produce copious watery discharges during anasarca. I have often observed this particular remedy,—which it is the fashion to disregard and decry at present, because it constitutes the greater part of a much vaunted and notoriously unsafe nostrum,—to act with great force both in occasioning free watery evacuations and in reducing the dropsy, yet without any particular tormina, exhaustion, or other uneasiness being occasioned, although it was administered once every two days, or even daily. As to the special objections to the employment of purgatives in granular disease of the kidnies, they are clearly inadmissible where an obstinate exhausting diarrhœa is present; and I must likewise allow that I have occasionally seen them apparently succeeded by this affection. Yet the latter accident is far from being so common as to form a sufficient ground for excluding them altogether; they seem to be indicated by spontaneous cures being sometimes accomplished through diarrhœa supervening naturally; and they may be thought preferable by theory to diuretics by some, who consider that the kidnies ought not to be subjected to any kind of stimulus. To these arguments let me add, that I have repeatedly found drastic cathartics most effectual and perfectly safe,—the anasarca quickly disappearing, and the diarrhœa ceasing so soon as the remedy was abandoned. And in other cases I have seen a mild diarrhœa succeed the action of a few doses, and continue till the anasarca disappeared, but no longer. Gamboge is the purgative I have most frequently employed, and generally in the dose of five grains, sometimes seven, very rarely nine. It appears of consequence to secure its being very finely divided by carefully pulverizing it with half a drachm of bitartrate of potash, otherwise it is more apt to excite griping. The rough-looking gamboge of Ceylon has seemed not less efficacious and convenient than the finest Siam varieties; and I have no doubt the one may be substituted for the other for all medicinal purposes. It should be given once every two days, except in urgent circumstances, or where a trial of it daily has shown it may be advantageously and conveniently given so often. I have occasionally employed elaterium for the same purposes and also with good effect, in the dose of a quarter of a grain. Sometimes bitartrate of potash alone acts powerfully as a hydragogue cathartic in the dropsy which accompanies granular disorganization of the kidnies. It has been already mentioned that when given in two-drachm doses, with the view of exciting a flow of urine, the bowels are sometimes acted on profusely instead of the kidnies; and this action may be induced with tolerable certainty by daily doses of half an ounce. But on the whole gamboge is the hydragogue which has appeared the most certain and most easily managed.

Under the treatment now recommended it is very rare to find anasarca increase to such an extent as to render puncture of the limbs unavoidable. But this necessity will nevertheless sometimes arise. *M. Solon* seems to infer that the practice of puncturing the limbs is not attended with particular risk in dropsy concurring with diseased kidney; because he says that there is little tendency to erythema from distension. My own experience is to the contrary. Two cases of extensive erythema are related in the Appendix, [Cases 16 and 27;] and in the former it followed puncture of the limbs. Acupuncture ought always to be preferred to incisions with the lancet. Half a dozen punctures with the needle in each leg will produce a prompt evacuation of fluid. I must observe however that acupuncture is not so entirely free of the risk of erythema and consequent sloughing, as some have supposed by whom this mode of evacuating dropsical effusions has lately been commended. In Case 16 death took place from erythema and gangrene after acupuncture; and about the same time I had a fatal case from the like cause where the source of the dropsy was diseased heart.

Diaphoretics should be conjoined with the purgative and diuretic plans in the treatment of anasarca; and they must be continued vigorously long after the dropsical effusion is evacuated.

The purgative plan is probably better adapted to the early than to the advanced stage of granular kidney. In the latter stage troublesome diarrhœa is much more frequent than in the former; and therefore the repeated use of powerful cathartics, known as one of the causes that give occasion to it, should be shunned if possible.

2. Among the secondary affections which the physician is called on to treat few come more frequently under his observation than *Disorder in the functions of the Stomach.* It was stated above that this often presents itself with the characters of ordinary dyspepsia; and in such cases it must be treated accordingly with bitters, antacids, and other familiar remedies. Where anasarca concurs with the dyspeptic symptoms, there is not a more effectual remedy for the latter than the removal of the former. Where the affection of the stomach puts on the form of chronic vomiting, it is both in its nature and effects more formidable, and more intractable in its treatment. When it occurs only at an early hour of the morning on the patient first awaking, it is sometimes removed by his taking a little food. In other circumstances a stimulant draught of ether, or a little brandy, is the most effectual palliative. Some

cases yield to the regular use of antacids, such as ten grains thrice a-day of magnesia, or twice as much bicarbonate of soda or of potash. Others are best treated by the application of blisters to the pit of the stomach. Others again are benefitted by the frequent use of hydrocyanic acid, in the dose of one, two or three drops every four hours or every two hours, more especially when it is given a few minutes before food or drink is taken, which it sometimes enables the stomach to retain and digest. Opium too is occasionally successful in this as in other varieties of vomiting from irritability. But perhaps the most certain remedy, at all events that which I have several times seen succeed where all other remedies for the same end had failed, is creozote, which may be administered twice, thrice, or oftener in the course of four and twenty hours, in the dose of one or two drops dissolved in an ounce of some aromatic water, such as the distilled water of cinnamon or cassia.

The physician, however, although he may be disappointed, ought to experience no surprise, on finding that all the above-mentioned measures prove ineffectual; for dyspepsia and chronic vomiting are almost always troublesome when associated with granular kidney; and in some cases they form the most prominent affection, and will not yield to any treatment.

3. *Diarrhœa*, if taken in time, may generally

be checked by the treatment usually employed in this country for arresting ordinary diarrhœa from crudities and other incidental irritations, namely by administering a full opiate, preceded or not by laxatives according to the duration and the nature of the discharges. Should this practice fail, or should the diarrhœa be of some standing, it must be treated like other chronic diarrhœas, or chronic dysentery, by a combination of opiates with astringents, together with the due regulation of the diet. It seems scarcely necessary to enter into particulars on this head. The most appropriate diet has seemed to me to be one as nearly animal as possible, with a sparing allowance of liquids, and the prohibition of malt liquors, and also of the broths usually taken for dinner by the common people in this part of the country. Where the diarrhœa seems obstinate, no remedy has appeared equal to the combination of acetate of lead with opium which is now in common use for chronic dysentery and diarrhœa of all kinds; and the only special remark required on the subject is, that most practitioners use the acetate of lead in too small doses, probably because the ancient dread of its activity as a poison is not yet so thoroughly dissipated as it might be. A pill of three grains of acetate of lead, with half a grain or an entire grain of opium, made up by means of conserve of red roses, may be given to the amount of three, four, or six in the course of the day according to the urgency of the symptoms; and even the largest doses may be continued for several weeks without any risk of unpleasant effects, at least so long as the diarrhœa is not subdued. In urgent cases it is often very useful to unite with this practice the employment of an anodyne suppository of three or four grains of opium once or twice in the twenty-four hours; and sometimes, where all these means failed, I have seen an occasional injection of ten or fifteen grains of acetate of lead in three ounces of water prove serviceable. Farther, the tendency to diarrhœa, like dyspepsia and chronic vomiting, is often materially corrected or altogether removed by the removal of anasarca, where the two affections happen to concur. It need scarcely be added that peculiar care should be taken to protect the patient at all times against cold by proper clothing and a warm apartment.

4. The *Inflammations of the Serous Membranes*, which are apt to occur as secondary to granular disorganization of the kidney, do not require any particular remark. They are to be treated in the ordinary way. The only circumstance which calls for special notice is that, where the primary disease is far advanced, blood-letting must be practised with as sparing a hand as possible, because the blood is already in a highly impoverished state; and it will usually be found that the circulation is affected by one-half or even only one-third the

usual amount of depletion which is found necessary to attain the same object in ordinary serous inflammations occurring in constitutions previously sound.

5. The same remarks apply to *Catarrh*. Depletion, except locally, is seldom called for in this secondary affection; for it is rarely acute in its character, and scarcely ever so without being attended with other urgent symptoms, such as extensive anasarca, dyspnœa disproportioned to the catarrhal disorder, tendency to coma, or such other affections as will themselves render blood-letting indispensable. Mere catarrh very rarely then demands general blood-letting. Yet it is commonly troublesome and obstinate, and requires constant attention. The treatment most frequently effectual consists in the application of occasional blisters, and in the use of anodyne expectorants, among which none has appeared more efficacious than a mixture composed of two ounces each of syrup of squills and peppermint-water, and three drachms or half an ounce of the ammoniated tincture of opium, with as much of the compound spirit of lavender. I do not know a better remedy for catarrhal coughs of all kinds than this mixture in the dose of half an ounce four or five times a-day; and in the catarrh which is secondary to disease of the kidney it is particularly serviceable. *Dr Osborne* commends repeated small doses of copaiva as an expectorant where the expectoration

is defective, and the acetate of lead with opium as an astringent where the sputa are excessive and do not relieve the oppression of the chest.

6. Of all secondary affections none is more formidable than *Coma*. It is commonly indeed fatal, and perhaps invariably so once it is fully formed. But at its commencement, when indicated by sopor merely,—where the patient has a constant tendency to doze, but may be roused, though with some difficulty,—the danger may be turned aside by proper treatment.

In the early stage of the primary disease, the comatose affection is one of very great urgency, and must accordingly be treated with energy. It is always at this period attended with great diminution of the urine, frequently with anasarca, very generally too with dyspnœa, and not unoften with local inflammation. All these circumstances, together with the comatose affection itself, call for general blood-letting as the primary remedy; and the effect of free evacuation of blood on the comatose disorder is in this stage unquestionable. The administration of brisk purgatives is of obvious utility as a collateral remedy. Diuretics too have always appeared to me of undoubted service. The supervention of coma on the other symptoms in the early stage of granular disease of the kidney is one of the cases, where the prejudice, which has lately arisen in the minds of some against the employment of diuretics in this disease and its secondary affections in general, may operate disadvantageously. An attempt has been made in a former section of this treatise to assign reasons for concluding that diuretics are not positively contraindicated in reference to the primary disease in the kidneys. But even if they were in that respect as equivocal remedies as *Dr Osborne* has been led by his own experience to infer, their injurious influence on the primary disease is not so great as to preclude their employment in circumstances of greater urgency,—in circumstances so urgent as where the threatened invasion of coma concurs with a tendency to suppression of urine. And this statement has the more weight, that in such cases the induction of diuresis, if not more effectual, is at least not less so, and likewise more permanent as a remedy, than any other mode of treatment which has come under my observation. The diuretics to be employed are the same with those indicated under the head of anasarca; and probably the combination of bitartrate of potash with digitalis is the most efficacious.

When the comatose affection supervenes during the advanced stage of granular disorganization of the kidnies, it usually forms more slowly than in the early stage. It is not apparently therefore so alarming an incident in the former as in the latter case; yet it is really more formidable, because it is counteracted with greater difficulty. On its first approach in the advanced stage benefit is occasionally derived from the employment of moderate evacuation of blood, especially from local blood-letting by leeches to the temples; but when the sopor becomes considerable the removal of blood seems of little or no use. The patient's state indeed would rather contraindicate depletion; for the countenance is usually blanched or dingy, not florid or congested, and the pulse is for the most part both feeble and slow. The appearances after death too confirm the inference drawn from the symptoms during life; because in all cases of death by coma in the advanced stage, the vessels of the brain, instead of being turgid, seem unusually empty, so that the brain generally is in a remarkable blanched condition. The fact is, that in all cases of the kind the efforts of the physician are much circumscribed. Brisk purgatives, where the patient's strength will admit of them, are occasionally of use. Diuretics are perhaps more frequently serviceable; and at all events where the soporose tendency concurs with a sudden decrease of the urine, diuresis always proves the most efficient check. But the relief after all is only temporary; the sopor invariably returns in no long time; and in short, where a distinct tendency to coma is remarked in the advanced stage of granulation, the fatal termination of the disease may be regarded as never far distant. I have not witnessed much benefit from blisters applied to the head; and the stimulant plan, which might appear to be indicated by the symptoms and the pathological condition of the brain, has not proved more beneficial than the opposite method of cure, by depletion. *Sabatier* once found quina useful on the approach of coma; and *Dr Osborne* in similar circumstances attaches great importance to large doses of calomel.

7, 8, 9, 10.—The treatment of the remaining secondary disorders may be discussed very briefly. *Chronic Rheumatism*, at all times an intractable affection, is sometimes peculiarly so when associated with granular disorganization of the kidnies; and there is nothing in its treatment when it is thus associated which requires mention. The frequent use of the warm-bath is more generally useful than internal remedies; and among the latter I have seen most benefit from the tincture of colchicum seeds, conjoined in the form of mixture with tincture of opium or solution of morphia. The treatment of *Pneumonia* is regulated by the same rules as that of inflammation of the serous membranes. *Tubercular degeneration* and *Enlargement of the Liver*, are among those diseases, for which, as they occur in this country, physicians at all times find much difficulty in providing a remedy; and when they concur, either singly or conjunctly with granular kidney, they can scarcely be combatted by any means. Regular living and the removal of other incidental complaints, under constant medical superintendence, may for a time delay or perhaps arrest the course of the one disease as of the other ; but the removal of the hepatic affection is scarcely to be looked for. I have seen one or two cases however apparently benefitted by the use of iodine, after anasarca and other secondary affections had been subdued. The same remarks apply to *Diseased Heart.* Diseases of the heart are not more easily removed by medical treatment when secondary to diseased kidneys, than when primary in their nature. Much relief however, may be obtained from the symptoms they give rise to by the removal of certain other secondary affections which frequently accompany them. Thus, the slighter organic affections of the heart, which often give great annoyance so long as other secondary diseases are present, such as catarrh or anasarca, may cease to disturb the patient for a long time, once those secondary diseases are removed. Nay in similar circumstances, even though the affection of the heart is far advanced, its symptoms may for a time disappear in a great measure, at least all the more manifest symptoms which attract the patient's attention as the causes of suffering.

ILLUSTRATIVE CASES,

WITH REMARKS.

ILLUSTRATIVE CASES,

WITH REMARKS.

I. Sudden Coma and Convulsions in the early stage of Continued Fever. Event fatal. Kidnies enlarged and turgid. Much urea in the blood.

Robert Walker, a night-watchman, 32 years old, of robust frame and regular habits, was attacked with the precursory symptoms of fever in the spring of 1836, when continued fever was epidemic in Edinburgh, and when his wife was recovering from it. He had previously enjoyed on the whole good health, and was a very active man. But about four years previously, while employed as a farm-servant, he was confined to the house for a few days with urinary complaints; and he was subsequently liable to frequent micturition, at times retention, and occasionally also to hæmaturia. The attack of fever commenced with nausea, vomiting, general pains, especially in the loins, headache, giddiness and ringing in the ears; which symptoms however were trivial except the pain of the loins, and this alone compelled him to remain at home from duty. The fever gradually became more severe and characteristic. On the 5th day he had in addition frequent calls, with much inability to pass urine, amounting on the 7th to complete retention. On the evening of the 7th sixteen ounces of urine were withdrawn by the catheter, and next evening twelve ounces more; none being passed in the interval naturally. On the 9th day, when I first saw him, he presented the marked characters of typhoid fever. He complained of great weakness, general soreness, frequent greenish vomiting; the face was brownish, flushed, oppressed, and characteristically febrile; the pulse was 100 and feeble, the tongue dry and furred, the bowels constipated, the skin rather hot and every where covered with pale-red, irregular, diffuse petechiæ; his answers were clear and intelligent, but he had muttering delirium when left quiet, and also subsultus tendinum. He was ordered a laxative solution, and a little wine cautiously, with a morphia draught at night. Eight ounces of urine were withdrawn by the catheter, but unluckily were not preserved for examination. He passed a restless night, and on the morning of the 10th day he was incoherent, torpid, less easily roused, and affected with frequent twitches of the face. The pulse was 120 and weaker, the tongue covered with sordes, deglutition difficult, the face flushed, and the eyes injected. Twenty leeches were ordered to the temples, and a blister over the whole head, also a purgative injection and a strong cathartic powder. But before these measures could be carried into effect, he was suddenly attacked with violent convulsions of the whole body, attended by deep imperturbable coma, squinting of the eyes, a full, strongly jarring pulse, and powerful action of the heart. The leeches and injection were used immediately, but without any improvement. Three ounces of urine were withdrawn by the catheter, which was turbid, brownish, strongly coagulable by heat, and in density 1014 before coagulation, 1013 after it. The coma continued profound, with occasional spasmodic tremor and contractions of the limbs; and death took place only two hours after the appearance of the convulsions.

Inspection.—The body was examined in 46 hours, the weather being all the while cold. The dura mater adhered firmly to the skull. The arachnoid over the brain was everywhere, even in the superior region, a good deal injected with blood, but not more so than is commonly observed from ordinary continued fever; and there was no unusual amount of serosity effused beneath it, or in the ventricles. The transverse section of the brain showed fewer bloody points than usual, and the substance of the brain and cerebellum was of natural consistence in every part.—The liver was of natural size, pale, uniform in colour, almost free of the brown hepatic substance, brittle, not however tuberculated. The gall-bladder contained pale-coloured bile. Both kidneys were very large, elongated one-third at least beyond their average length, and very flabby. Their tubular structure seemed healthy enough, but dark. The cortical structure presented much greater breadth than usual, its fibrous structure was very obscure everywhere, and in most parts obliterated,—generally darker than natural,—exuding a good deal of blood from a fresh cut surface,—and presenting a remarkable mottled appearance, composed of the ordinary brown cortical tint, chequered uniformly with small, brighter, brownish-red or blood-red points. There was no urine in the bladder, which was consequently much contracted; and its inner membrane, which was firm, presented half a dozen livid spots somewhat less than a sixpence, arising from laminar extravasation under the mucous coat.

Two ounces of fluid blood were removed from the cavity of the heart, with due precautions to preserve it free of admixture. This was shaken with four ounces of rectified spirit; and the fluid when filtered was evaporated cautiously to dryness in the vapour-bath. The residue was boiled with rectified spirit, and the solution again evaporated to dryness. The residuum had a decided urinous odour. It was dissolved in a little water, filtered, concentrated to a small volume, and then treated with half its volume of nitric acid. A considerable number of brown crystalline scales were immediately formed, accompanied with effervescence, and the emission of an odour like that arising from the action of nitric acid on concentrated urine.

Remarks.—This case seems a characteristic example of what Dr Bright has correctly, in my opinion, considered the early stage of granular disorganization of the kidnies. The history for some years before would seem to show that the man had been repeatedly threatened with the invasion of the disease. The morbid appearances indicate that the cortical texture alone of the kidnies was affected, at least visibly disorganized. The affection had there obviously advanced somewhat beyond the stage of mere turgescence and bloody injection, the fibrous structure having in a great measure disappeared, and an approach being apparently made to granular deposition. The increased size of the kidnies seemed entirely owing to the augmented breadth of the cortical substance,—a state which contrasts strongly with the contraction of the same texture commonly seen at a more advanced stage.

The serious effects in certain circumstances of even a limited suppression of the urinary secretion are here well exemplified. I have several times found the blood loaded to a much greater degree with urea than in the present case, without any tendency to coma being manifested; and a greater amount of diminution of the urine not unfrequently occurs, without the functions of the brain seeming for some time to suffer. But in this instance the brain and nervous system had also to encounter the oppression arising from the typhoid form of continued fever.

Other cases of the same kind with that given above, and where the disease in the kidnies was farther advanced and distinctly of the nature of granular degeneration, have been observed in the Edinburgh Infirmary during the last eight years. None of them however, occurred under my own care, and I am unable to supply the details. But Case II. is given as a clear instance, though not illustrated by an inspection after death. At an earlier period, before the publication of Dr Bright's researches, I had noted the occurrence of death with sudden coma and convulsions during continued fever in no fewer than eleven cases. There is no improbability in the supposition that some of these cases, which appeared inexplicable at the time from the total absence of morbid appearances in the brain, and apparently in every important organ of the body, would have received elucidation had the disease of the kidnies indicated by Dr Bright been then known. For it has been stated above that the presence of this disease appears to give a constitutional tendency to epidemic disorders generally; so that cases of the kind alluded to must every now and then present themselves. And certainly every instance of death from sudden convulsions in fever which has of late occurred in the Edinburgh Infirmary, and underwent proper investigation, has proved to have been connected with an albuminous state of the urine and with organic disorder of the kidnies.

II. Anasarca. Continued Fever. Fatal Coma and Convulsions. Disease of the Kidnies probably in the early stage. Blood somewhat deprived of colouring matter.

Thomas Green, aged 48, a tall, large-boned, and rather muscular carter, of intemperate habits, and bearing the appearance of being so, was admitted into the Infirmary in the middle of June for anasarca. He had a similar illness in 1825, and again in the autumn of 1836, on both of which occasions he was bled. For some time afterwards he enjoyed excellent health, with the exception that he had generally to get up during the night to pass urine, and for some months had been subject to paroxysms of neuralgia of the face. Towards the close of May 1838, subsequent to fatiguing exposure in the night-time, he was attacked with rigors, followed by general swelling of the body. In three weeks, when he came under my care, he had considerable general œdema, especially of the scrotum; and he complained of frequent intense headache, attacking him principally in the morning, and affecting the right side of the face and forehead. The pulse was small, slow, and firm; the bowels were commonly constipated; the urine was scanty, 1019 in density and strongly coagulable by heat; and his mouth was moderately affected with mercury, which he had taken after the œdema came on. Some blood was drawn from the loins by cupping, and next day sixteen ounces more were taken from the arm, which were buffy. Six grains of gamboge were also repeatedly given in fine powder with a drachm of bitartrate of potash; and for the neuralgic affection, blood was drawn locally by cupping and leeches, and subsequently sulphate of quina was given to the amount of nine grains daily, on its being observed that the pain was regularly periodical. Under these measures the œdema and swelling of abdomen slowly decreased, and the neuralgia abated. But in the last days of June all his complaints were aggravated, although the urine had slowly increased to five pounds daily. Its density was 1020 and it continued highly coagulable. He was now bled again from the arm to sixteen ounces, and ten minims of tincture of digitalis were given thrice a-day. This blood was slightly buffy; its serum was opalescent, and did not contain any urea according to the usual process of analysis; and the composition of the blood in 10,000 grains was fibrin 27, solids of the serum 527, hæmatosin 1046, water 8163. In a few days more, no distinct improvement having taken place, he was ordered the warm-bath every other evening, and regular doses of acetate of ammonia as a diaphoretic; while the electuary of carbonate of iron was substituted for the quina as a tonic, the digitalis continued regularly, and the gamboge repeated from time to time. On the close of the first week of July the neuralgia of the face became less severe subsequent to the removal of a decayed tooth; but the œdema was rather increasing, although the urine amounted to nine pounds daily. The diuretics and diaphoretic were discontinued; and towards the end of the second week of July he began to take two drops of croton-oil occasionally, with ten grains of the compound colocynth mass. Under brisk watery diarrhœa thus excited, and the maintenance at the same time of the urine between eight and twelve pounds in quantity daily, gradual amendment at length decidedly set in; and on the 9th August, when I ceased to have charge of him, there was scarcely any œdema left, the neuralgia had for some weeks entirely ceased, and he was much improved in strength, alertness, and cheerfulness. The urine during this period was 1015 when about eight pounds, 1008 when at twelve pounds, and invariably very coagulable. During the ensuing fortnight when he was under the care of my colleague Dr Alison the urine fell in amount, but matters were still going on favourably; he had become stout and active; and it was agreed that he should quit the hospital in a day or two for the purpose of resuming his employment;—when upon the 25th of August he was seized with the precursory symptoms of continued fever, which at the time was very prevalent in the city and hospital. The fever for nearly a week seemed to go on mildly enough and required no particular or active treatment. But on the seventh day it was observed that drowsiness set in more suddenly than usual, and coma ensued with a rapidity not common in the ordinary run of fever cases; while the urine became diminished in quantity. On the ninth day of the fever, the coma being profound and the urine almost suppressed, he was attacked also with convulsions, and in a few hours he expired.—Unfortunately the friends could not be prevailed on to allow an examination of the body.

Remarks.—Although deprived of the precise information supplied by an inspection of the dead body, it seems to me that we can give a consistent and clear account of the chief circumstances in this case. The disease of the kidnies was in its early stage. This appears in the first place from the symptoms; for no importance can be attached, in the instance of a regular dram-drinker, to the necessity of passing urine having long disturbed him a little during the night. The inference however is in the second place strongly borne out by the condition of the urine and of the blood. The urine had on the whole a high density, not less than 1020 when the quantity was sixty ounces, and on one occasion 1022, when the quantity was thirty-six ounces; while its albuminous impregnation was very strong. The blood, six weeks after the symptoms of diseased kidney distinctly betrayed themselves, still contained seventy-three per cent of its hæmatosin; and part of the diminution was referable to the recent loss of towards thirty ounces of blood by venesection, cupping, and leeches together. Both the urine and the blood therefore were on the whole characteristic of the early stage of granular disorganization of the kidnies, I am almost inclined to add, as an additional reason in favour of the primary disease being at this stage,—the obstinacy of the dropsical effusion. This connexion has been adverted to above in the text. Here we see the œdema stationary, or actually even advancing, although for three weeks the urine had never been under three pounds, seldom under five, and latterly not less than nine daily, and was likewise of tolerable specific gravity. As in many other cases, however, this singular obstinacy of the dropsical effusion did not in the end prevent its removal by perseverance in a variety of measures; and the purgative plan was that which seemed the most effectual.—The most interesting feature of the case is the manner of death. As in the important case of Walker (I.), coma and convulsions suddenly occurred during an attack of continued fever, while he was convalescent from the complaints which brought him to the hospital; and, as in every case of the sort I have seen, death very speedily followed. *See Case* 1.—There was no reason to suppose in the case of Green, that any other organ but the kidnies was diseased. There was no evidence of any affection of the liver either from direct symptoms or sympathetic disorders.

III. Catarrh. Chronic Vomiting. Tendency to Diarrhœa. Death from Inanition. Kidnies in the advanced stage of Granulation; and without Organic Disease in other Viscera.

Robert Johnston, aged 56, was admitted into the Infirmary in October 1830 chiefly on account of catarrh. For four years he had laboured under feebleness, and for ten months under numbness and coldness of the right leg. For three weeks he had been affected with frequent painful micturition, and also with indigestion, and a sense of distension and tenderness of the belly. He was compelled to make water every hour, which led to an examination with the sound, but without any stricture or stone being found. The urine however was found to be twice the natural quantity, 1011 in density, and slightly coagulable. In the beginning of November the urine was 48 ounces daily, 1010 in density, very pale, and much more coagulable. He was greatly emaciated, and had received no relief from cupping of the loins, blisters, or diuretics, and only temporary relief from opium. In the second week of that month he began to suffer from frequent vomiting, and almost constant discharge of food and drink for days together. He had also a great tendency to diarrhœa, with tympanitic distension and tenderness of the belly. In the third week of the same month the urine was increased by digitalis to eight pounds daily; but with no other effect than to add to the frequency of micturition. In the end of the month there was for ten days a considerable discharge of ropy mucus with the urine, which greatly increased the dysuria. The urine at this time was 100 ounces in quantity, 1010.5 in density, and faintly coagulable. No material change took place in the month of December. In the beginning of January a caustic issue was applied to the loins without relief. The symptoms continued the same; and the patient gradually became more and more exhausted, partly by the frequent vomiting of food, and partly by the torture occasioned at night by his being incessantly roused from sleep to pass water. In the beginning of February, the vomiting, which for some weeks had been less considerable, began to recur much more frequently. The urine continued abundant and of the same density, but was again very coagulable. The diarrhœa and tympanitis recurred at intervals. He died at the end of February, with little change in the symptoms, except that for nine days before death only one ounce of urine was discharged on an average daily, and sometimes none for thirty-six hours. The vomiting for the last three weeks was incessant: Every kind of food and drink, and every anti-emetic remedy which could be thought of, were immediately discharged. He died wasted almost to a skeleton, and constantly alive to his sufferings: within an hour of his death he recognized me, and complained of the torture occasioned by the vomiting.

Inspection.—A little clear serum was found in the abdomen. The liver was healthy. The stomach was also free of disease. The bladder was much contracted, in a few spots reddish on its inner surface, but otherwise natural. Both kidnies were much diseased. A yellowish granular matter had taken the place of the whole cortical substance; and had also encroached considerably on the tubular structure. This was particularly observed in the right kidney, one-half of which presented no appearance of tubular structure at all. Both kidneys were rough externally, and somewhat under the natural size. The lungs and the heart were natural.

REMARKS.—The case of Johnston was the first where my attention was called to the disease of the kidney as existing alone and independently of dropsy. It is a most remarkable example of acute suffering from complicated urinary symptoms, apparently unconnected with any other disease in the urinary organs except granular disorganization of the kidnies. The symptoms were most inveterate, none of the ordinary remedies having given any relief. Leeches and blisters at first seemed to lessen them a little. But afterwards various diuretics, mercury, laxatives, opium, antispasmodics, alkalis, uva-ursi, and the like were tried without any alleviation being obtained. Neither were any of the usual anti-emetic remedies of material service in allaying the vomiting. Unfortunately the discovery of creozote had not then been made. The manner of death was in this man's case very remarkable. He seemed to waste, as it were, gradually away, and to die of inanition, in consequence of food not being retained upon the stomach. The complete absence of coma,—indeed, it may be said, the integrity of the mental functions, almost to the very point of death,—in connexion with an almost total suppression of urine for nine days, is a most unusual circumstance. I have met with one other instance of the kind only, which occurred in the practice of one of my hospital colleagues. It is well known, that in the greater number of cases the material reduction of the urine in cases of granular kidney, and still more its suppression, is followed in the course of three days by symptoms of approaching coma, which speedily proves fatal.

IV. Chronic Vomiting; probably Chronic Pneumonia; Diarrhœa and Enteritis; dropsy; Latent Peritonitis; event fatal, from exhaustion produced by the complex secondary diseases. Kidnies in a very advanced state of granular disorganization.

William Hamilton, a shoemaker, aged 38, of intemperate habits, was admitted into the Infirmary early in October 1835 on account of amaurosis and headache. He had been several years subject to headache, subsequently to repeated attacks of syphilis; and the amaurosis of the right eye was also of some years' standing, that of the left of a fortnight's date only. These symptoms disappeared in a great measure in the course of fourteen days under the use of cupping, laxatives, and the warm-bath. Towards the close of October he had hæmoptysis, dyspnœa and feverishness, which were removed by mild antiphlogistic measures, excepting the hæmoptysis, which recurred occasionally throughout the remainder of his life. In the beginning of November he became subject to constant sickness and frequent vomiting, not relieved by any ordinary anti-emetic remedies, but removed for a short period by calomel carried so far as slightly to affect the mouth. At the end of this month the vomiting having returned with violence, attention was drawn to the state of the urine; and it was found to be very pale, in quantity about twenty-four ounces daily, of the density 1010, and slightly coagulable by heat and acids. Soon afterwards a constant tendency to watery diarrhœa presented itself; in the middle of December he became drowsy; and at the end of the same month anasarca made its appearance, with signs of condensation of the lower lobe of each lung and crepitation in the remaining part of the right. Under the use of acetate of lead as an astringent for the diarrhœa, and digitalis with a little calomel as a diuretic, he experienced in some respects considerable relief. But before diuresis was established the difficulty of breathing became excessive; and for a long time no remedy was of any avail for arresting the frequent protracted fits of violent vomiting. At length towards the close of January 1836 some relief was obtained from the vomiting under the occasional use of creozote. Hitherto this patient was under the care of my colleague Dr Alison. On the 1st of February when he came under my charge in my turn of service as Clinical Professor, I found him still subject to urgent diarrhœa, frequent cough, and severe vomiting when the creozote was discontinued; he had a frequent, feeble pulse, a dingy leucophlegmatic, vacant countenance, and excessive exhaustion; but there was no dyspnœa, little anasarca, and a free discharge of pale urine, light in density. Little change was made in the treatment. The diarrhœa continued to recur, checked however at times by acetate of lead and opiate suppositories and injections. The vomiting began to resist the creozote,—during the administration of which, by the way, it was ascertained by very careful observations that the urine had a powerful odour of the drug. The urine rapidly diminished in quantity till it became only eight ounces in five or six hours, which had a density of 1015. His exhaustion quickly increased, and without any other symptom except extreme prostration he died about eight days after he came under my charge; and he retained his intelligence till a few hours before death.

Inspection. — We were unfortunately able to obtain permission to examine the abdomen only. In the cavity of the peritonæum were found seven pounds of muddy serum with a few floating shreds of opake, brittle lymph. The liver was natural in size, of a pale yellowish colour, and with rather less of the brown substance than in its healthy state. The inner surface of the stomach presented a few reddish spots, but was otherwise natural. The mesenteric glands were generally enlarged somewhat. At the termination of the ileum as well as throughout the whole colon, especially at its sigmoid flexure, the mucous membrane was very red, with fringes of lymph adhering to it abundantly, and some ulcers of no great size. The kidnies were remarkably small and shrivelled, being scarcely half their natural size. Their outer surface was rough and irregularly granulated, and adhered very slightly to their investing membrane. The fibrous structure of the cortical portion could not be traced any where, and indeed this portion of the kidnies was properly speaking gone, because the outer edges of the tubuli uriniferi were drawn as it were almost to the very surface. The tubuli were themselves very delicately fibrous, unusually limited in extent, several of them entirely obliterated, and their places occupied, as well as the spaces between those which remained, with a grayish-red, obscurely granular matter. The urinary bladder was contracted, its parietes consequently thick and strong, its inner membrane white, firm, and without any vascularity whatever.

Remarks.—This is an illustration of the extreme obscurity with which organic derangement of the kidnies may for a long time advance. There seem to have been no symptoms of local uneasiness whatever at any time. And it was only the obstinate tendency of the vomiting to recur, together with the frequent connexion previously observed between chronic vomiting and latent disorganization of the kidnies, which led to the examination of the urine and the consequent discovery of the real primary disease, nearly two months after the man had been under constant and careful medical superintendence. The case also illustrates well the exceeding complexity and variety of the secondary affections which are apt to arise during the latent course of the primary disease. Chronic vomiting, inflammation of the intestinal mucous membrane, general anasarca, peritonitis, which have been described as frequent secondary affections in the body of this treatise, were here all present; while the symptoms rendered the occurrence of chronic pneumonia not improbable, and the inspection after death showed that the liver was also beginning to undergo organic derangement. Although the primary disease was obviously far advanced, still a good deal of the tubular structure of the kidnies remained. The complete destruction of the cortical portion in this and other instances illustrates the general statement in the text, that the cortical structure always suffers soonest and most. The peritonitis was altogether latent; for the nature of the effusion proves that it was recent, yet for many days before death there was no symptom to draw towards it the attention either of the patient or his attendants.

V. Anasarca and Ascites. Catarrh. Fatal Coma. Kidnies in an advanced stage of granulation. Tumour in the Brain.

Robert Irving, an out-pensioner of Chelsea, of battered, dissipated appearance and intemperate habits, was admitted into the Infirmary on account of dropsy in the middle of July 1828. He had suffered from the Walcheren fever in 1809, and in 1814 had a large abscess, which was opened at the pit of the stomach and discharged four pounds of matter. Three weeks before his admission he was attacked with extensive œdema of the legs and swelling of the abdomen, without any febrile symptoms or any local uneasiness. When he came under my care, the œdema of the limbs was very considerable, and the belly distended and distinctly fluctuating. The urine was natural in quantity, and strongly coagulable by heat. He was ordered first squill and then digitalis, and also a little mercury; under which the urine became more abundant, and greatly less coagulable, so as to be made only hazy by heat. In the middle of August the dropsical accumulations were materially diminished. The mercury having begun to affect the mouth it was discontinued on the 22d. The urine from this time till the 8th of September varied from 110 to 140 ounces in quantity, from 1012 to 1014.5 in density, and also considerably in coagulability, though in general it yielded an abundant flaky precipitate by heat. The patient was now very greatly improved, fluctuation being no longer perceptible in the abdomen, and the œdema of the limbs being almost entirely removed. He had about this time an attack of dysentery, which was then epidemic in the hospital; but it was of short standing. The urine then fell somewhat in quantity and increased in density, at first without any interruption to his amendment. But on the 22d September the œdema and ascites began to return, although the urine continued at 90 ounces daily and had a higher density, namely 1016.4. This increase of density however was partly owing to a great increase in coagulability. Soon afterwards he was attacked with husky cough, dyspnœa, and other catarrhal symptoms. Hitherto the treatment had been mainly confined to the digitalis prescribed a few days after his admission. But squill was now substituted for it, and two drachms of bitartrate of potash were also given thrice daily. This plan was commenced on the 30th September. On the 11th October he was seized with dimness of vision, and intense pain and sense of weight in the head; while the dropsical effusions had increased, and the urine fell to 30 or 40 ounces, and had a density of 1018.3. His diet was immediately reduced, digitalis and mercury substituted for the other diuretics, and twelve ounces of blood were taken from the arm, which presented a buffy appearance and yielded a very light serum of the low density of 1019.2. The swelling of the abdomen was in consequence reduced, though no increase had taken place in the urine. But as the head symptoms were only for a time relieved, leeches were applied to the forehead, and the blood-letting was afterwards repeated to the extent of sixteen ounces. The serum of the blood was again very low in density, namely 1020; it coagulated loosely with heat; and its solid contents were 6.8 per cent. The headache and dimness of sight were thus greatly relieved, the catarrhal symptoms also abated, and the œdema and ascites diminished, though still the urine did not increase. On the 26th the digitalis having begun to act constitutionally, it was discontinued as well as the mercury; and the bitartrate of potash was resumed, at first in the dose of two drachms, and afterwards in that of two drachms and a-half thrice a-day. Under this treatment the urine quickly increased to seven pounds and became almost free of coagulability; the catarrhal symptoms, which at first were rather aggravated, gradually subsided under the effects of a blister and an expectorant mixture; the dropsical swellings entirely disappeared; his strength improved; and on the 2d of January he was dismissed, having been free of œdema for three weeks, though the urine had gradually subsided to five pounds a-day. At his dismissal the urine was strongly coagulable; but for six or seven weeks before it varied much in this respect, and was repeatedly, once indeed for some days, nearly free of albuminous impregnation.

Seven weeks after leaving the hospital, he was readmitted with similar complaints, and came under the care of my colleague Dr Alison. There was considerable œdema and ascites, together with headache, confusion of thought, squinting to the right side, dimness of sight, dilated, sluggish pupil, and incomplete paraplegia. These symptoms were of four weeks standing. The urine was moderate in quantity and strongly coagulable by heat. Venesection and purgatives at first seemed to relieve the head symptoms. But the œdema and ascites continued; drowsiness gradually came on, and his confusion and insensibility increased; on the 10th of March he had an attack of convulsions, which were removed by cupping the temples; delirium however followed, then spasms of the arms and coma, and he died next morning.

Inspection.—There was slight effusion in the subarachnoid cellular tissue, and a few drachms of serosity were found in the lateral ventricles, chiefly in the left. The brain was unnaturally hard, and showed more bloody points than usual, as well as a greater flow of serosity from its substance. In the left ventricle, behind and on the outside of the *thalamus*, there was a large, soft, brownish tumour, displacing the fornix and reaching into the descending cornu; which, as well as the posterior cornu, was much enlarged. The medullary matter around the tumour was much disorganized, softened, and broken down. The corpora striata and choroid plexus were healthy. A similar tumour had begun to form in the right ventricle. There were some pounds of serum in the abdomen. The right lobe of the liver adhered to the diaphragm, but was otherwise quite healthy, and without any trace of a former abscess. Neither was there any adhesion of any organ to the peritonæum under the region where a scar was seen on the upper part of the belly. Both kidnies were unusually small, hard, pale and botryoidal on the surface. Their cortical part was pale and granulated, nowhere fibrous; and a great part of their tubular portion was encroached upon by a deposit of grayish-yellow matter, and destitute of its proper fibrous structure. The other abdominal viscera were healthy. The lungs presented considerable serous infiltration. The heart was healthy.

REMARKS.—This case has been already published, and in much greater detail in my paper on Renal Dropsy in the Medical Journal for October 1829. It is here reproduced, not merely as illustrative of several points adverted to in the preceding pages of the present work, but likewise as a solitary case among all which have come under my notice, of fatal coma in granular disease of the kidnies being connected with positive organic disease in the brain. In all other instances I have had occasion to observe, the remarkable symptoms of derangement of the cerebral functions which preceded death have been found unconnected with any marked deviation from the natural state in the dead body, except unusual bloodlessness of the brain and its membranes.—From the early history of the case, as well as the condition of the urine, which was highly coagulable and not of low density, the organic disease of the kidnies seems to have been only in the early stage at the period of the patient's first admission into the hospital. If this be admitted, it follows from the appearances found after death, which were those of the disease in a state of considerable advancement, that although the secondary affections were successfully treated, the primary morbid action went pretty steadily forward. The highly coagulable state of the urine, notwithstanding that it often singularly alternated for a little with an almost total absence of albumen, is a farther proof that the irritation of the kidnies was never effectually subdued. On the whole I presume the present case will be considered by the opponents of the diuretic plan as some evidence of the incompatibility of that method of treating dropsies with a tendency to granular deposit; and were similar cases frequent their doctrine would stand on a strong foundation. But it does not appear to me that the few observations of this nature which have been made here can be placed in opposition to the much more numerous instances of a contrary nature,—where, after the removal of dropsy by diuretics, the patients have passed a long interval, even several years, without any material disturbance to the health, and with the urine nearly or entirely freed of albuminous impregnation.—Irving's case is an excellent illustration of the occasional obstinacy of dropsical effusion in disease of the kidnies. It is certainly a very interesting, and till of late it would have been thought an extraordinary phenomenon, that œdematous effusion should go on gaining ground with a daily discharge of urine to the amount of seven pounds, and of the density of 1016.—The low density of the serum of the blood corresponds as usual with a high proportion of albumen in the urine.

In the first account which was published of this case a full statement was given of the composition of the urine at various periods. I do not know that any inferences of material interest may be drawn from these facts; but it may not be amiss to recapitulate them here in a tabular form. The quantity of urine is supposed to be 1000 parts.

	Urea & lactates.	Inorganic salts.	Albumen	Total solids
Healthy urine, 35 ounces at 1029 D.	55.2	12.1	0.4 mucus.	67.7
Irving, Sept. 12, 110 oz. at 1013.4 D. symptoms much improved.	20.4	3.7	5.1	29.8
Sept. 22. 90 ounces at D. 1016.4 œdema returning,	23.7	4.4	7.9	36.9
Sept. 29. 48 ounces at D. 1016.3 œdema and ascites and catarrh,	24.7	4.2	9.1	38.6
Oct. 15. 36 ounces at 1016.3. For some days head symptoms in addition to the œdema.	23.3	6.5	9.2	39.3
Oct. 16. After bleeding for head symptoms, density 1019.1, 36 oz.	27.2	8.4	10.8	46.5

Several omissions will be observed in the narrative of the case. In particular a careful analysis of the blood would have been a very desirable addition to the other facts. The case however was one of the first instances of granular disease which came under my notice; and many points, which have since become important, at that time naturally escaped attention.—Contrary to the doctrine advocated by some, there was here very considerable ascites, without any disease of the liver.

VI. Frequent Rheumatism : Anasarca : Diarrhœa : Fatal Coma with increasing Œdema. Kidnies far advanced in granulation ; Liver tubercular ; Mitral Valve diseased.

Isabella Murray, aged 27, a woman of irregular living and intemperate habits, and who had been repeatedly attacked with severe rheumatism, was admitted into the Infirmary in the middle of August 1829 for a similar attack, which was acute, and lasted for five weeks. She was at the close of this period very leucophlegmatic; but my attention was not drawn to the state of the urine.

In the end of September she was readmitted with inflammatory dropsy of four days' standing, which was ascribed to exposure to wet and cold. She had much œdema and considerable ascites, with tenderness across the epigastrium and pain in the loins; severe dyspnœa and husky cough; strong, irregular pulsation of the heart with some bellows' sound; and in the lower part of the right side dulness on percussion and obscure respiration. The urine was pale, in quantity forty ounces, 1014 in density, and very slightly coagulable by heat. She was twice freely bled from the arm with relief, had leeches applied to the loins, and got digitalis, bitartrate of potass, and a daily mercurial pill. On the 7th of October the œdema was nearly gone; yet the urine had never increased in quantity, its density was 1015, and its coagulability still very slight. In ten days more the urine increased to six pounds. Soon afterwards the mercury was discontinued, as it began to affect the mouth. On the 6th of November the œdema obviously was again gaining ground, though the urine was six pounds daily. Its density was 1011.5, and its coagulability the same as before. The digitalis, which had been abandoned some time previously, was resumed and given along with squill; but without any effect on the œdema, which on the contrary increased with rapidity. Blood-letting was then, though reluctantly, practised on the 13th and 15th,—on each occasion with manifest diminution of all the symptoms. For the rest of the month of November the urine was maintained steadily at five pounds daily, but without any farther progress being attained. On the 2d of December, the œdema and dyspnœa having again become much worse, blood-letting was once more resorted to, and this time too with decided relief. But the patient was now greatly reduced in strength, and was seized with profuse watery diarrhœa, which neither purgatives, nor opium, nor astringents could check. On the 10th she became for the first time drowsy; and the urine also quickly fell to two pounds daily. The drowsiness soon passed into perfect coma; the dropsical swellings increased greatly; and on the 15th she died.

INSPECTION.—The heart was somewhat enlarged in its left ventricle, but its parietes were not thickened. The columnæ carneæ were partially converted into a firm fibro-cartilaginous substance, and the mitral valve was thickened. The liver was extensively affected with yellow tubercles of the kind usually observed in drunkards, and several of the tubercles were large, firm, and very solid. Both kidnies were far advanced in granular disorganization; the morbid deposit had taken the place completely of the cortical structure; a great part of the tubular structure was also destroyed; and the remaining tubuli were invaded and compressed by the yellow granular matter.

REMARKS.—This case, which was communicated by me to Dr Gregory, and introduced by him into his paper, is here republished as an interesting example of diseased kidney in many respects, but chiefly as the best illustration I have hitherto encountered of the extreme complexity sometimes observed in the secondary affections. There are indeed very few of the more important secondary disorders, which were not present at one time or another. Severe rheumatism, catarrh, tubercular liver, organic disease of the heart, dropsy, diarrhœa, coma, were here all unequivocally developed. The state of the urine on the 30th of September, pale, low in density, and very slightly coagulable, seems sufficient proof that the primary disorder existed some time before the attack of rheumatism in the middle of August. It may be doubted however, whether the disease of the liver or that of the kidnies was the first affection in point of date: Both were found, on inspection of the body, to be very far advanced.—This was one of the first cases to draw my attention to the singular fact, which will be seen often exemplified in the present Appendix, that dropsy may not merely continue, but even also increase, although the secretion of urine exceeds the natural standard in point of quantity, and thus compensates for its deficient density, so as to throw off the full daily average of urea and other solids which are discharged in the healthy state. From the first week of October till the middle of November the œdema increased on the whole steadily, although the urine was scarcely ever under 48 ounces, and commonly averaged 60 or even 70 ounces daily.—It is mentioned in the narrative that the mouth became affected with mercury toward the end of October. This took place after mercury had been given in the form of a mercurial pill daily for three weeks; the affection was slight from the first; and it speedily receded without any unpleasant symptoms. The inference from the repeated occurrence of such cases seems to be, that mercury may be often given in moderation in granular degeneration of the kidnies without risk or injury, provided its effects be diligently watched; and that it need not be so exclusively prohibited as some are inclined to hold.

VII. Dropsy; Latent Pneumonia; Coma, ending fatally. Granular disease of the Kidnies in the Middle Stage; Hepatization of the Right Lung. Blood poor in colouring matter, and loaded with urea.

Samuel Ritchie, a tailor, 16 years of age, had been affected for two months before coming under my care with frequent micturition, which compelled him to get up three or four times every night. For four weeks however of this period he was otherwise well and strong. At length, after having been much exposed to cold and privation in the north country, his body generally began to swell. Three weeks afterwards, when he arrived in

Edinburgh from Inverness, he suffered from dyspnœa on exertion, thirst, and frequent micturition, but without pain any where. He was not confined however till a fortnight later, the 22d March 1836, when he complained of severe headache; and on the evening of the same day he was found in a state of insensibility, with dilated pupils, a frequent, sharp pulse, stertorous breathing, tracheal rale with occasional suspension of the respiration, and subsequently convulsions, especially of the face. In this state he was bled to the extent of forty ounces; and the blood was speedily coagulated, much cupped, very buffy, and unusually serous. The stertor was in consequence diminished, and the insensibility and convulsions abated towards morning. The state of the urinary secretion at this period and for some days previously had not been attended to. Next morning, when I saw him for the first time, he was very drowsy, but easily roused, and he then gave intelligent answers. The pulse was frequent, small, and incompressible; the breathing very hurried and noisy; the body generally, but especially the face, neck, and upper part of the chest, affected with anasarca, pitting in some places on pressure, and elastic in others; the abdomen distended and somewhat fluctuating; the countenance and skin generally leucophlegmatic; and his chief complaint was of headache. Blood was immediately taken from the arm to the amount of twenty ounces, which he bore well; and four grains of gamboge were given with bitartrate of potash, by which the bowels were freely moved. No improvement however was obtained; the coma gradually increased; the convulsions returned in the evening, attended with increased heat of skin; and he died in the ensuing morning, twenty hours after he came under my care. During this period no urine was passed; and the catheter introduced twelve hours before death did not bring any away.

The blood withdrawn before death was not buffy, but presented a small clot and superabundant serum. The serum had a density of only 1019. The blood, analyzed according to the first of the processes in page 65, was found to contain in 10,000 parts 62 of dry fibrin, 521 of dry serum, and 564 of hæmatosin; so that both the albumen and the hæmatosin, but especially the latter, were materially defective. Part of the serum was reduced to dryness in the vapour-bath, then pulverized, and boiled with alcohol. The filtered alcoholic solution being next evaporated to dryness, the residue was dissolved in water, and the watery solution filtered and concentrated. On the addition of nitric acid a great quantity of crystalline pearly scales was immediately formed, so that the whole fluid seemed to become solid.

INSPECTION.—The membranes and substance of the brain were everywhere unusually destitute of blood and pallid. A minute bloody effusion was seen under the arachnoid on the back part of the right hemisphere. There were two drachms of serosity in the ventricles. No softening, tuberculation, or other unhealthy appearance could be detected on a careful examination of the whole brain, cerebellum, pons, &c.—There was a pound of pale serum in the right side of the chest, half as much in the left side, and a few ounces in the cavity of the pericardium. The lower two-thirds of the right lung adhered to the chest by strong old adhesions; the two lower lobes were uniformly condensed, of a deep grayish-red tint, marbled with rose-red, and without any air removable by pressure; and the upper part of the same lung was gorged with serosity. A small portion of the lower lobe of the left was similarly condensed with the right lung, and the rest of it was gorged with serosity, though still capable of giving out numerous air-bubbles. The larger bronchi in both sides contained much brownish liquid. The heart was natural in size and structure. The right cavities and pulmonary artery contained a large clot of partially decolorized fibrin, firmly interlaced with the columnæ carneæ, and very tenacious.—The peritoneal cavity contained some pounds of clear serum. The liver, natural in size, presented a predominance of brown matter, and at the edge some translucency. The spleen was dark above, rose-red below. The kidnies were of natural size, lobulated, of a uniform pale yellowish-white colour, chequered with a few red vessels arranged here and there in rays. The investing membrane was loose; and when it was removed, the surface of the kidneys presented a finely granular texture. They were flabby. When cut, they presented a uniform grayish-yellow ground, on which the usual coarsely-fibrous structure of the cortical part could nowhere be seen, while the tubuli uriniferi were beautifully displayed, of a pale rose-red hue, very delicately fibrous, and in various parts, especially of the left kidney, much invaded by the grayish-yellow matter. The bladder was blanched, but otherwise natural. It contained a few ounces of urine highly coagulable by heat, and 1014 in density. The mucous coat of the intestines seemed soaked with serum, but in other respects healthy.

REMARKS.—This may be considered a case of acute or inflammatory dropsy; probably induced by exposure to cold, during the middle stage of granular disorganization, or that condition of the kidnies in which their cortical structure is disorganized, but their tubular portion only a little invaded. The advanced state of the disease in the kidnies was well marked by the condition of the blood; for, even making allowance for the effect of the previous free blood-letting, there was a marked diminution of the hæmatosin, which formed only about two-fifths of the natural proportion. The very low density of the serum of the blood, and the decrease which had taken place in the albumen, sufficiently prove that the urine for some time before death must have been highly albuminous, exactly as was found to be the case with the small quantity of urine in the bladder after death. As in all other cases of death by sudden coma in this disease, the urine for some time before was almost suppressed: The few ounces found in the bladder when the body was inspected must have been the secretion of at least thirty-six hours, because none was withdrawn by the catheter twenty hours before the patient died. In correspondence with this condition of the urinary secretion, the blood was much loaded with urea, more so perhaps than in any other instance I have hitherto had occasion to examine. Pneumonia was here developed as a secondary affection in a very marked degree: I have indeed seldom met with such extensive hepatization of the lungs. Nevertheless it was not characterized by distinct symptoms during life; for on the most careful inquiry it could not be ascertained that the patient had any other complaint referable to inflammation of the lungs except dyspnœa under exertion; which, moreover, anasarcous infiltration might have been thought sufficient to account for. The want of turgescence of blood-vessels in the brain, the positive defect of blood there,—a remarkable appearance after death by coma,—corresponds with what I have invariably witnessed in advanced granular disease of the kidnies.

VIII. Anasarca: Emphysema and Catarrh: Fatal Coma. Disease of the Kidnies far advanced. Blood charged with urea. Aortal Valves granulated.

Francis Magee, aged 57, a weaver, was attacked with pectoral complaints in 1829, subsequently to the healing up of an old ulcer of the leg. These complaints recurred frequently, and became much worse in 1827. About the same time he seems to have had an apoplectic attack, which was treated by blood-letting; and always afterwards he observed his urine to be pale. In the beginning of June 1828 he had lumbar pain, difficult micturition, and frequent vomiting. Early in July œdema of the legs and fulness of the abdomen were added to these ailments. In the beginning of August, when he came under my care, he had dull pain in the loins, tenderness across the upper part of the belly and frequent discharge of pale, moderately coagulable urine, in natural quantity. There was everywhere clearness on percussion of the chest, faint impulse of the heart, general sibilant or sonorous prolonged respiration, with much dyspnœa, frequent hard cough and tough opake sputa. The œdema was considerable; the pulse 52 and small;

the bowels usually constipated. Under the use of tincture of digitalis, three times a-day, and a little mercury every other evening, the urine increased in quantity, and the œdema and fulness of abdomen entirely disappeared in a few days. On August 8th the urine was nine pounds in quantity and 1008 in density. On the 16th of August it fell to three pounds and a half, with a density of 1008.4, great paleness, and more coagulability. The œdema nevertheless did not return; but the dyspnœa and other pectoral symptoms were unabated; and drowsiness set in, with headache, contracted pupil and tremor of the hands. Although the head symptoms were somewhat relieved by the removal of fourteen ounces of blood, they speedily acquired greater force; laxatives, stimulant clysters, leeches to the temples, and a blister over the whole head were equally unserviceable; complete coma formed; and he died on the morning of the 21st August, four days after the first threatening of comatose symptoms. For three days before death he passed daily no more than twelve ounces of urine, which was very pale, 1009.5 in density, considerably coagulable, and composed of 976.1 water, 14.7 urea and lactates, 4.6 inorganic salts, and 3.5 albumen.

Inspection.—There was slight œdema of the legs, no lividity of the face, no blood at all in the scalp. The sinuses of the dura mater were moderately full. About half a drachm of serosity was found in each ventricle, and half an ounce in the base of the skull. The whole substance of the brain, and the whole membranes, even at the base of the skull, were remarkably blanched and destitute of blood or vascularity. The cineritious substance of the brain appeared narrow. The left thalamus presented a cavity as big as a cherry-stone, walled in by dense cerebral tissue and crossed by filaments of cellular membrane. The pericardium and base of the left lung adhered to the costal pleura. The left pleural cavity contained four ounces of serum, the pericardium none. The left ventricle of the heart was thickened in its parietes and contracted in its cavity; and the aorta, with its valves, was rugous and rigid. The lungs were emphysematous in front, œdematous behind; and their bronchial tubes were gorged with mucus. The stomach and intestines were healthy, the liver somewhat enlarged, but not otherwise diseased, the spleen firm and composed of radiated masses. The right kidney was diminished somewhat in size, externally grayish-brown and rough with nodules, internally pale grayish-yellow. The tubuli uriniferi were invaded by a grayish-yellow, obscurely granular matter, which seemed to have contracted them in size and pushed them outwards to the edge of the kidney, where no texture could be seen like the natural cortical substance; and the tubuli themselves were pale and checquered with the morbid deposition. The left kidney was very small and flabby; its cortical substance in the same condition as in the right kidney, but presenting also a few distinct tubercles; and the tubular portion was dark-brownish-red, not fibrous, but in some parts cellular, the cells being apparently the remains of the infundibula. The ureters were both pervious. The capsular fat on both sides was indurated; and the tunica propria was thickened and adhered firmly.

An ounce of blood taken carefully from the vena cava was coagulated by heat, broken down, and agitated with distilled water. The filtered fluid was evaporated to a thick syrup, which was boiled with alcohol; and after the alcohol was driven off from the alcoholic solution, a little nitric acid was added to the residuum. The whole mass immediately passed into a congeries of grayish-red, flaky, pearly crystals. It is not unworthy of remark that both the watery extract of the blood, and the alcoholic extract obtained from the watery one, exhaled when heated a strong fetor, exactly like that of the patient's breath during his lifetime.

Remarks.—This was the first case I met with of granular disorganization of the kidnies; of which it presents a very excellent illustration in the most advanced stage; where not merely the cortical, but likewise the tubular structures, are in a great measure destroyed. The left kidney was in all probability quite incapable of discharging any part of its function; for it may be said that nothing remained of its secreting apparatus except the mere receptacles of the secretion,—the infundibula. The condition of the urine corresponded with the condition of the kidnies: When only a third of the healthy average in quantity, it presented scarcely a third of the average healthy density: Or if we compare the analysis with that of healthy urine (p. 190,) the daily excretion for some days before death contained about one-twelfth only of the natural amount of urea. In these circumstances I thought it right to make a careful search for urea in the blood; in which in analogous cases this principle had been indicated by Dr Bostock, but where it had not been detected altogether to the satisfaction of pathologists. The result was the unequivocal discovery of urea; a fact which I have since confirmed, as will be seen from the present list of cases, in a great number and variety of instances both during life and after death.—The extraordinary blanched appearance of the brain and membranes, and the unusual want of vascularity, attracted general attention at the time, more especially when the manner of death was taken into account. We now know that such a state of the blood-vessels of the brain is very general in the same circumstances, and that it depends on the condition of the blood,—which in this case would probably have been found on analysis to be scarcely less defective in hæmatosin than any that has hitherto been examined.

IX. Anasarca: tendency to diarrhœa: Fatal coma: Kidneys in the advanced stage of granular disorganization: Cerebriform degeneration of the Mesenteric Glands: Inflammation of the Ileum.

David Cuthbertson, aged 55, a weaver, of rather stout frame, and intemperate in his habits, was attacked early in February 1838 with rigors, followed by scanty, frequent micturition, cough, pain in the right side, and general swelling of the body. He had previously been compelled from want of work to labour out of doors in very harsh weather, and often went chilled to bed. The cough and pain soon ceased, but the swelling continued with little alteration till the middle of June, when he came under my charge in the University Clinic of the Infirmary. There was then a good deal of fulness in the neck and abdomen, much less in the legs, and very little in the chest or arms,—considerable leucophlegmatia, very little dyspnœa, a good appetite and digestion, and integrity of all other functions except of the urine. He reported his urine to be scanty; and in the first examination of it, which I did not witness, it is stated in the reports to have been very coagulable both by heat and nitric acid. Both those statements however were probably incorrect; at least the character of the urine was quite different in two days, and afterwards varied very little till near his death. When first accurately examined, it was ascertained to be eight, ten, and twelve pounds in quantity daily, very pale, and slightly coagulable. The treatment to which he was subjected consisted in the occasional administration of five grains of gamboge, with a drachm of bitartrate of potash,—the regular use of the warm-bath,—and the employment of Dover's powder at night, together with acetate of ammonia repeatedly throughout the day, as diaphoretics. Under this system, however, no material reduction was effected in the œdema, although the urine was never much under twelve pounds daily. After three weeks of treatment the acetate of ammonia was abandoned; and he got thrice a-day a pill composed of a grain and a half of ipecacuan and two grains of hyoscyamus; which however was abandoned as it caused sickness. The œdema now began to subside, and it continued to do so more distinctly after all medicines were abandoned, and the treatment was confined to a daily warm-bath, which was observed to occasion some sweating. In the end of July the œdema and fulness of abdomen were inconsiderable, and he was in a general way much improved. The urine continued to be twelve pounds daily, slightly coagulable, very pale, and 1006 in density. Early in August the œdema rather showed a tendency to increase, and the urine to fall in quantity; on which account croton-oil was given occasionally. The purgative method was abandoned in consequence of a tendency to permanent diarrhœa being manifested; and the decoction of broom-tops was given in the dose of three ounces thrice a-day with good effect upon the urine. Towards the middle of August, when I ceased to take charge of him and he came under the care of my colleague Dr Traill, the œdema, which had subsided, again showed a tendency to increase; and the diarrhœa returned for a day or two. For a month subsequently he seems on the whole to have gone on more favourably. But in the middle of September the œdema again increased somewhat, and he complained of pain in the loins, for which he was cupped with relief. On the 14th September there was some return of diarrhœa; soon afterwards the urine became diminished in quantity; drowsiness began to show itself, with languid pulse and great prostration; profound coma gradually, though quickly supervened; and death took place on the 18th September, two days after the appearance of the comatose affection.

Inspection.—There was a good deal of watery effusion into the general cellular tissue, a considerable quantity of serum in the abdomen, less in the chest, very little in the pericardium. The subarachnoid cellular tissue contained a considerable quantity of serosity, and the ventricles about an ounce. The brain itself was natural in consistence. Its vessels and those of its membranes were somewhat bloodless, but not particularly so. The heart was healthy. So was the liver. The kidneys were but little diminished in size, smooth and pale on the surface, entirely destitute of the proper cortical structure, and presenting a deposition of yellowish granular matter, which encroached considerably on the tubular masses.

All the mesenteric glands were diseased, and formed a large lobulated mass of tumours, of various sizes, aggregated, firm, and cerebriform in appearance. The omental glands were similarly diseased, though to a less extent. The vessels in the neighbourhood of the enlarged glands were quite pervious. The mucous membrane of the lower part of the ileum was red, thick, and very firm, irregular from numerous little nodules of lymph, and thrown into numerous small rugæ, thick, firm, yellow, and resembling valvulæ conniventes. These appearances gradually became fainter upwards and terminated near the middle of the ileum. The mucous coat of the stomach was healthy at the cardiac end; but in the middle and towards the pylorus there were a few small spots, like ecchymosis, depressed, softened, and easily removed so as to leave little cavities in the membrane.

Remarks.—The inspection shows that the kidnies were here in a considerably advanced state of disorganization, some of the tubuli having been invaded by the morbid deposit. This confirms my suspicion, that an incorrect account was taken in the first instance of the state of the urine.—The case is a remarkable illustration of an occurrence described in the text of this work as not uncommon,—namely the permanence or even increase of anasarca, in spite of diuresis to the extent of three or four times the healthy average for weeks together. It is not improbable that this diuresis was spontaneous. But certainty cannot be arrived at; because the patient had taken one of his doses of gamboge before the urine was measured, and gamboge sometimes brings on diuresis during dropsy.—The mode of death, by coma, is that which has appeared to me more common than any other in granular degeneration of the kidneys; and as usually happens, there was no apparent incidental cause for it. In the present case, however, though there were no signs of undue cerebral action during life, rather indeed the reverse, as in other cases in like circumstances, more appearances of derangement were found within the head than are commonly observed. The extent of effused serosity on the surface and in the cavities of the brain was, it appears to me, morbid, and at all events much greater than I have been in the custom of seeing in fatal coma from diseased kidnies. The tendency to diarrhœa, a common secondary affection in the advanced stage, was not strongly marked in Cuthbertson's instance; but was sufficiently accounted for by the state of the mucous membrane of the ileum.—The enormous extent of mesenteric disease found in the dead body was not indicated during life. At least it is not easy to see what symptoms could be referred to it, which were not referable to other causes. Possibly it accounts for ascites having been more than usually prominent as a dropsical affection. I have once or twice met with slight enlargement of the mesenteric glands in kidney dropsy, but in no other case with material disease.

X. Scarlatina: Anasarca: Chronic Vomiting; Fatal Coma. Kidnies in an advanced state of granulation. Blood exceedingly poor in hæmatosin.

William Hutcheson, aged 23, a tailor, of doubtful habits, and of strumous constitution, was attacked with scarlatina in the commencement of April 1838. The attack appeared to have been slight; but was followed in a week by shortness of breath, anasarca, and scanty urine, consequent on exposure to cold. There seemed to have been also some feverishness. No particular treatment was practised, so far as could be learned from him. He never had been bled. In the beginning of May he was admitted into the Infirmary, and was at first under the care of Dr Traill. He had at that time slight œdema and ascites; headache, with discharge from the left ear; a natural pulse; a dry tongue; much thirst; a good appetite and digestion; and scanty, high-coloured urine, of the density 1012, and not coagulable by heat. He was ordered occasional cathartics, a little bitartrate of potash every morning, and three ounces of decoction of broom-tops thrice a-day; and he was allowed a little meat for dinner. Under this treatment the urine soon increased to twelve or fifteen pounds daily, became pale blood-red in colour, 1010 in density, and distinctly, though slightly, coagulable both by heat and nitric acid. In the middle of May ten ounces of blood were drawn by cupping from the loins, but without any marked result. At this time he began to be much annoyed with vomiting late in the evening and early in the morning; and it seldom quitted him afterwards. But it did not interfere either with his digestion or with his appetite, which was indeed rather strong and not very discriminating. In the end of May, the urine still continued very abundant, reddish, and coagulable. Yet the œdema had not entirely disappeared, though it was inconsiderable and chiefly observed when he had been for some time out of bed.

Matters underwent little alteration till the middle of June, at which period he came under my charge. I found the œdema and ascites gone,—the morning and evening vomiting generally troublesome, though commonly relieved by creozote, which he had taken occasionally for three weeks,—the countenance heavy, dingy, and leucophlegmatic,—the urine scarcely twelve ounces daily, pale smoke-brown in colour, 1010 in density, and moderately coagulable by heat as well as nitric acid. There was considerable drowsiness; yet when awake, he was lively and intelligent. For some days previously, he had a regular attack of severe rigor in the evening, followed by vomiting, then by intense heat and restlessness, and afterwards by profuse, long-continued sweating. The febrile symptoms seemed connected with irregularities in diet; and on restricting him to a moderate allowance of nutritive food, they disappeared. A week afterwards he complained of pain in the loins and difficult micturition, with which he had occasionally been affected before, and which were relieved by a sinapism to the loins and half a dozen leeches. There was then a slight reappearance of œdema and fulness of the abdomen. He was now put upon the diaphoretic plan, acetate of ammonia being given frequently, the warm-bath administered daily or every other day, and the whole body defended against cold by flannel. He likewise got a mixture of calumba infusion with bicarbonate of potash as a tonic. In the end of June there was some improvement. He had less frequent vomiting, and less drowsiness, looked more lively, ate his meals heartily, passed eight pounds of urine daily, and had no longer any œdema. The leucophlegmatic dinginess of the complexion, however, was not diminished. In a few days the vomiting and drowsiness returned; and the urine was nine pounds in quantity, 1006 in density, very pale smoke-brown in colour, and very slightly coagulable. On July 9th, the vomiting having been more than usually troublesome, and the pulse having become firm and more frequent, with heat of the skin, I directed six ounces of blood to be drawn from the arm. The blood presented a thin buffy coat, a very small crassamentum, an abundant, slightly lactescent serum of the high density 1031; and its composition was in 10,000 parts 45 fibrin, 956 solids of the serum, 427 hæmatosin, 8572 water. About this time diarrhœa attacked him and continued for several days; but it was checked by a pill three times a-day composed of a grain of opium and three grains of acetate of lead. From this period no material change took place for a month. The vomiting was sometimes absent for a few days together, but frequently recurred with severity; the drowsiness increased; the dinginess of the complexion became deeper; and the urine continued faintly coagulable, seldom under seven pounds in quantity, 1006 and eventually 1005 in density, very pale, and muddy from a fine flaky matter insoluble by heat. In the first week of August he had an attack of acute pain in the left side of the chest, greatly impeding respiration, but without any distinct affection of the pulse, or any sign of disease to be elicited by auscultation; and this complaint was removed by ether and morphia, followed by an anodyne injection. On the 9th of August, my turn of service as clinical physician being ended, I ceased to take charge of him, and left town. An accurate account was unfortunately not kept of the remaining part of his illness. It appears however that on the 10th the pain in the chest returned, but attended with increase of drowsiness; that the stupor very gradually increased till perfect coma was formed; and that in this state he died on the 13th. I have been unable to obtain a clear account of the condition of the urine in the last days of his life.

Inspection.—The body was examined in 39 hours. There was a small quantity of serosity under the dura mater. The surface of the brain, as well as the substance of the brain itself, was unusually free of vascularity and very bloodless. A small quantity of serosity was effused into the lateral ventricles, and a little more into the cavity of the spine. In the chest the heart was found healthy. A little clear serum was effused into each pleural cavity, amounting to fifteen ounces in all.—The spleen was soft, not enlarged. The liver was of healthy appearance, perhaps firmer than natural.—The investing membrane of the kidnies was loose. The kidnies were somewhat diminished in size, and slightly lobulated, of a pale grayish-brown colour externally and internally, not distinctly granulated. On a longitudinal section being made, the tubuli uriniferi were found more compressed and finely fibrous than natural, and surrounded by pale grayish-brown, obscurely granular matter, which also occupied the whole situation of the cortical structure, destroying its usual fibrous appearance, and indeed apparently displacing it. Some of the tubuli were also to appearance displaced, and their situation occupied by the same morbid deposit.—I believe a complete inspection was made of the other viscera; but as an account of the details was not preserved, I am unable to state them with precision. No particular appearances of disease, however, were seen.

Remarks.—This is a case of extreme interest. It is an unequivocal example of granular disorganization of the kidnies supervening upon scarlatina. At least prior to that illness, the young man had enjoyed good health and had never laboured under any of the symptoms, which in the great majority of instances attend the early stage of the disease in its latent form. Except the kidnies, it appeared from the examination of the body after death, that no other organ presented any distinct organic alteration of structure ; and an opinion to the same effect was formed during the patient's lifetime. The secondary affections were those which have occurred the most frequently in my observation, namely anasarca, chronic vomiting, and coma. The last affection was unattended with any marked indication of disease in the brain or its membranes : As in almost all the cases of fatal coma I have had an opportunity of examining in the advanced stage of this disorder, the membranes and the brain itself presented a remarkable blanched, bloodless appearance. For the reason mentioned above I do not know whether or not any other affection was found in the dead body to account for the chronic vomiting except the disease in the kidnies ; but from the history of other cases of the same kind no other disease was necessary to account for that symptom.—The most interesting circumstance in the case is perhaps the extraordinary state of *anæmia* to which the patient was reduced. I have repeatedly seen cases where the excessive paleness of the complexion, and extremely low density of the urine, left little doubt that a similar or even greater degree of diminution of the colouring matter of the blood had taken place. But I have had no opportunity of actually examining the blood in the cases in question; and besides, in all of them the impoverishing effects of the disease in the kidnies were aided by more or less frequent blood-letting, as well as a defective appetite or digestion. But in the instance of Hutcheson we see the influence of granular disease of the kidnies, in reducing the proportion of hæmatosin in the blood, characteristically developed without any concurring agent. For, prior to the removal of the blood, which was taken after he had been ill three months and a-half, he had been bled once only, to the insignificant amount of ten ounces; his appetite was almost always good and his digestion sound, since the vomiting occurred at a period of the day which did not interfere with his meals; and there was, as already mentioned, no organic disorder except that of the kidnies. Yet the hæmatosin of the blood was reduced seventy per cent; which is the lowest reduction I have yet had occasion to ascertain by analysis. It is farther worthy of remark, that the diminution of the solids in the blood did not at all affect the albumen; for on the contrary this principle was increased by twelve or fifteen per cent,—a state which corresponds with what I have observed in other circumstances where the hæmatosin was very defective. Pathologists are as yet but little acquainted with the immediate consequences of this impoverished condition of the blood. The present case might supply materials for speculation on the subject. But it is more consistent with the sober progress of pathological science to allow facts of the kind to accumulate before aiming at generalizations. Meanwhile it seems well made out that, if this state of the vital fluid does not of itself lead to coma by defective stimulation of the brain, it contributes at all events very powerfully to the operation of the real immediate cause or causes of that fatal affection. A very large proportion of my cases, where the kidney disease attained an advanced stage, and where consequently the blood had become very deficient in hæmatosin, have died of coma, sometimes suddenly, but for the most part gradually induced; and in Hutcheson's case, on the day I gave up charge of him I predicted, that in no long time the event would prove fatal, and that coma would in all probability be the manner of death.—The morbid appearances in the kidnies were what might have been expected from the symptoms; complete destruction of their cortical structure, and considerable invasion of their tubular portion also. But I must admit that I looked to find even more extensive displacement and disappearance of the tubuli uriniferi than the examination of the body presented.—Little need be said of the treatment. The objectors to the diuretic plan of treatment may discover a fact favourable to their opinion in the hæmaturia and coagulability which attended the operation of the broom-tops. The diaphoretic plan however seemed not more serviceable.—Creozote was the only remedy which had any material effect in preventing the vomiting that commonly took place in the morning.

XI. Catarrh: Enlargement of the Heart: Dropsy: Sudden Coma, ending fatally. Granular disease of the Kidnies in the advanced stage: Œdema of the Lungs, Hypertrophy of the Heart, and Incipient Disease of the Liver.

Mary Morison, aged 70, after having been subject for six years to severe cough, great dyspnœa, and expectoration occurring in frequent paroxysms, was attacked in October 1834 with pain, coldness, and swelling of the legs subsequent to exposure to cold and wet. The swelling gradually extended upwards and at length affected the abdomen, and was then accompanied with such increase of dyspnœa as prevented her from lying down. She had no urinary symptoms prior to the appearance of the anasarca, and after that merely diminution of urine. After labouring under these complaints with little variety in their degree for four months, she was admitted into the Royal Infirmary and came under my care. Her chief suffering was from frequent cough, with orthopnœa and muco-purulent expectoration; but she had also much œdema of the legs and swelling of the abdomen. The sternum was arched, the chest unusually resonant on percussion in front, and the respiration everywhere mingled with mucous, sonorous, and subcrepitant râles. There was distinct fluctuation in the abdomen; but the parietes were also very œdematous. The heart's apex pulsated feebly between the sixth and seventh ribs. Its impulse was faint, its sounds distinct, equally audible in the epigastrium and to the right of the sternum as in the præcordial region, but not accompanied with any unnatural murmur. The pulse was frequent. The urine seldom exceeded sixteen ounces daily; its density was 1016; its colour was pale, and it coagulated feebly with heat, but abundantly with solution of corrosive sublimate. Under the use of antispasmodic draughts of sulphuric ether and morphia, and of an expectorant mixture of squills and opium, the pectoral symptoms were in a few days greatly relieved. Digitalis and squill having no effect in inducing diuresis, the bitartrate of potash was substituted in the dose of two drachms thrice a-day; which acted in the first instance on the bowels and afterwards on the urine also. In the course of four weeks a great diminution was thus effected in the œdema and ascites; the breathing became so easy that she could sleep a little in the recumbent posture; and her strength was considerably improved. She had however a tendency to incoherent talking, and frequent restlessness. At length on the 9th of February the urine, which had previously amounted to five or six pounds daily, became suddenly very scanty; languor, drowsiness, and collapse of the countenance ensued; the drowsiness quickly passed into deep coma; and she died on the 11th. Two pounds of urine were withdrawn with the catheter on the morning of the 10th and again on the 11th; its density was 1008; and its coagulability was inconsiderable.

Inspection.—The vessels of the cerebral membranes as well as of the brain itself were less injected than usual. There was a good deal of serosity effused over the whole brain under the arachnoid, but very little into the ventricles or base of the cranium. The cerebral arteries presented numerous rings of ossification.—The lungs adhered generally to the chest. They were everywhere œdematous, yet pervious to the air, globules of which could be squeezed in abundance from every part. The upper part of the left lung was emphysematous. The bronchial membrane was generally red. The heart was enlarged, and uniformly in all its parts. The parietes were thickened, especially those of the left ventricle. There was some roughness along the base of the aortal valves, but the floating edges were free. The mitral and tricuspid valves were somewhat rigid. On the whole there seemed too little departure from the natural state seriously to affect the functions of any of the valves. The aorta and pulmonary artery were large, in correspondence with the magnitude of the heart.—The liver presented an unusual predominance of its yellow substance. The kidnies were externally pale, and both of them were small, especially the left, which was scarcely a third of the natural size. Their investing membrane was easily detached; and their external surface was lobulated and botryoidal. In both kidnies the cortical substance was no longer fibrous, but granular, and exceedingly narrow, particularly that of the left. In the right kidney the tubular structure was much invaded by grayish-yellow granular matter, and some of the tubuli were altogether displaced by it. In the left the tubuli were very small and delicately-fibrous, but not so much invaded.

Remarks.—The present is an instance of what is mentioned in the body of this work as not uncommon,—namely the sudden supervention of coma after the subsidence of dropsical effusion; and here this incident seems to have occurred although the urine was not very materially diminished below the healthy standard. I suspect it must be considered, like many others, as a case of apoplectic coma without morbid appearances within the head: At least the serous effusion on the surface of the brain was not greater than is often seen where no head symptoms preceded death. There was throughout the whole contents of the cranium the usual blanching and want of vascular turgescence observed in similar cases. The catarrhal affection, which here was anterior to the disease in the kidnies, occasioned an amount of disturbance, especially a degree of dyspnœa, which was out of all proportion to the real amount of disease in the lungs. This circumstance has been frequently observed. And it exemplifies the general statement in the text, that the coexistence of granular disorganization of the kidnies is apt to impart to other diseases a character of severity or malignity which they would not otherwise present.

XII. Anasarca: Tendency to Diarrhœa: Ulceration of the Larynx. Death from Peritonitis. Kidnies far advanced in Granulation.

Janet Mackay, aged 25, unmarried, was attacked with sore throat in November 1829, subsequent to exposure to cold and wet; and three weeks afterwards her legs began to swell. In the middle of December she came under my care in the Infirmary. She had then inconsiderable œdema of the legs, tympanitic distension of the abdomen, redness of the fauces, and a frequent small pulse. The urine was rather above the natural quantity, extremely pale, strongly coagulable, and only 1004.5 in density. There was constant tendency to diarrhœa, which was checked only for a short time by opium and astringents. Little change took place for some time in the symptoms. Her chief complaint was of her throat, which got steadily more and more painful, and became attended first with huskiness and then with loss of voice. For three or four days before her death she complained of tenderness in the hypogastrium; and nausea, of which she had long had more or less, became very troublesome. She died three weeks after admission. A short time before death the urine was 56 ounces in quantity, 1009.5 in density, and scarcely coagulable; but five days earlier it was distinctly coagulable.

Inspection.—Some clear serum was found in the cavity of the chest. The parietal peritoneum was very vascular, recent lymph was effused over the whole intestines, and several ounces of sero-fibrinous, turbid fluid were found in the cavity. The intestines were not ulcerated; but the mucous coat on each side of the ileo-cæcal valve was very soft and chocolate-coloured. The liver was pale, not otherwise diseased. The kidnies presented a distinct granular structure over their whole surface. Internally a grayish-yellow granular matter had invaded the whole cortical structure, and almost the whole tubular structure also, leaving few of the tubuli not obliterated. There was considerable ulceration on the upper part of both the pharynx and larynx ; and the epiglottis had been almost entirely destroyed by it.

REMARKS.—This case was communicated by me to Dr Gregory ; by whom it was published in his paper. I quote it here chiefly because it illustrates the occurrence of a secondary affection not very often met with, namely peritoneal inflammation, which was here obviously quite recent and acute, and nevertheless was very obscurely indicated by symptoms during life.—It is quite plain, not less from the appearances after death, than from the condition of the urine at the time of her first coming under observation, that the disease of the kidnies was of much older standing than might appear from the date assigned to her first illness. It is to be regretted that the history of the patient for some time before the appearance of the œdema was not carefully inquired into. But indeed at the time the case occurred, the slowness and insidiousness of the disease in many instances was not very well understood.—I have taken little notice of the treatment ; for it was merely palliative, and of trifling service.

XIII. Pneumonia: Apparent Continued Fever: Recovery. Relapse, resembling Pneumonia, and ending fatally with Coma. Pneumonic Condensation found after death; Diseased Liver in the early stage; Disease of the Kidnies in the advanced stage.

Mary Wightman, aged 46, the mother of several children, and reputed of regular habits, was admitted under my care into the Infirmary with symptoms of pneumonia on the 2d April 1838. Her pectoral complaints were of two months standing, but had become severe only a few days before her admission. There was cough, with viscid expectoration, generally clear, but often tinged with blood; hurried breathing; dulness on percussion in the lower region of both sides of the chest, but particularly of the right side; absence of respiration in the lower right side; crepitating respiration, without vesicular murmur, in the lower left side. As she was pale, emaciated, and weak, and the pulse, though frequent, was by no means strong, leeches were used, tartar-emetic given in small nauseating doses, and a blister applied to the chest. The pulmonary symptoms were subdued materially by these measures in four days. At this time she exhibited an unusual sensibility to the action of opium, followed by great debility, which rendered wine necessary. In two days more, namely a week after her admission, she gradually fell into a state closely resembling continued fever; the leading symptoms of which were nausea and occasional vomiting,—frequent small pulse and some increased heat of the skin,—stupor, gradually increasing almost to coma, and accompanied with subsultus of the tendons of the wrist, and occasional starting and general tremor,—excessive prostration,—dry, brown tongue,—and a dingy, oppressed countenance. But her state differed in some measure from the typhoid fever then prevalent; for the stupor was formed very early and quickly, and also went off rather rapidly; neither was there ever any appearance of petechiæ, which at the time were very rarely wanting in the second week of true continued fever. From this condition the patient gradually recovered: her strength also slowly returned; the pectoral complaints, though never entirely removed, became comparatively trifling to appearance; and towards the termination of May she was dismissed,—still however weakly, emaciated, and pale.

She never thoroughly regained her strength, or got rid of her cough; and in the end of June, after getting wet, she was seized with pain in the lower part of both sides of the chest, severe cough, and expectoration of tough bloody mucus. In twelve days she was re-admitted into the Infirmary under my charge, with symptoms exactly the same as those of her former attack; but she was thinner, paler, and more feeble. She was treated much in the same way as before, by leeches and tartar-emetic, and afterwards by tincture of colchicum and morphia. On the 19th July, eight days after her admission, the cough had materially subsided; the expectoration was scanty, free of blood, and clear; the breathing was much less frequent; and the crepitation, which was at first strong in the lower part of the left side, had become much less marked and more mucous. In short the pneumonic attack seemed effectually arrested. But she showed at the same time a great degree of drowsiness and increased feebleness; so that it became necessary to withdraw a small quantity of morphia she had been taking, and to prescribe wine. For a day or two the somnolency was somewhat diminished; but it afterwards returned, along with a dry tongue, languid pulse, slow respiration, starting, and frequent tremor of the hands. Her state was now exactly the same as on the former occasion; but the stupor gradually passed into perfect coma, which ended fatally on the 24th July. In the night preceding her death her sensibility returned materially for a time, and she suffered much from dyspnœa.

Inspection.—Four days after death. There were extensive old adhesions of the lungs to the parietes of the chest. The right lung was small and much encroached on by the liver, which ascended as high as to a level between the second and third cartilages of the ribs. The bronchial tubes in both lungs were red and gorged with mucus. In the lower lobe of each lung there were several portions of the size of walnuts, which were condensed so as to sink in water, redder than the adjacent pulmonary texture, and granulated. The left lung was much larger than the right. The liver was somewhat enlarged, weighing five pounds, and presenting an unusual proportion of the yellow substance. The spleen was small and firm. Both kidnies were small. They presented characteristically the appearances observed in advanced cases of granular disorganization, their structure being granular, their cortical substance entirely displaced, and much of their tubular portion being also obliterated. A cyst as big as an egg was found adhering to the right ovary. The head was not examined.

Remarks.—I have related this singular case as an instructive one in several respects, but chiefly as a lesson for those who profess themselves unable to meet with granular disorganization of the kidnies in their practice. On two several occasions the patient was under my observation; and on each occasion the symptoms were anomalous. My attention however happened to be fixed on the more prominent disease; she was believed to have died of pneumonia with an anomalous typhoid fever; and on inspecting the body corresponding appearances were found, still however not fully explanatory of the history of the case, because they were limited in extent. At length another disease was suddenly discovered, the existence of which had not previously been thought of. The kidnies were seen in a very advanced state of disorganization; this was obviously the primary disorder; and now every difficulty, every apparent anomaly vanishes. We can now understand the cause of her exhausted, bloodless condition at the first. We can now comprehend the nature of the supposed febrile attack in April, an affection which at the time was called typhoid fever, though doubtingly, and chiefly because no other reference for it was apparent. We see too the cause of the woman's slow and imperfect recovery, as well as of her speedy relapse. And finally, we are at no loss to explain the manner of her death,—obscure as it appeared at the moment,—but now obviously lying in the most natural course of things, in the progress of granular derangement of the kidnies. This then was clearly a case of disease of the kidnies for the primary disease, with pulmonary inflammation as a secondary affection. Had anasarca ever showed itself, the true nature of the disease would have been discovered. Perhaps the coma ought equally to have led to this discovery. But my attention was all along turned to the disease palpably present, and not improbably led away from the full truth by my having at the time 8 clinical patients out of 36, who were known to labour under the kidney disorder with every possible variety of complication. An incident somewhat similar is mentioned by *Professor Forget.* Wishing to compare the appearance of a healthy kidney with that of granular degeneration, he fixed on a case of fatal pneumonia for the purpose. But the kidnies in that instance too were found advanced in granular degeneration, although no symptom to this effect had attracted his notice during life.—Wightman's case illustrates well an observation made in the body of this work, that granular degeneration of the kidnies imparts a peculiar character of severity, to the affections which occur incidentally or secondarily. How severe for example was the constitutional oppression! and how trifling the amount of actual pulmonary disease!—The urine was never examined during life; nor was there any found in the bladder after death. It was known however that she had passed very little for two or three days before death, and this chiefly without notice in bed.

XIV. Frequent Pleurisy; Stomach-complaints; Anasarca. Event fatal, by Pleurisy. Disease of the Kidney probably in the advanced stage. Blood loaded with urea and poor in hæmatosin.

Mr M. aged 32, a medical practitioner in a country district in the north of Scotland, had been long subject to stomach-complaints, but enjoyed otherwise good health till the autumn of 1833, when he had a severe attack of inflammation in the right side of the chest, for which he was repeatedly and freely bled. In November 1834 he had a second attack of the same nature, for which blood was freely drawn three times. After this he recovered strength so as to resume a laborious professional practice, but was constantly subject to sickness and occasional retching on first leaving his bed in the morning. Early in February 1836 he began to suffer from dyspnœa; the retching and vomiting in the morning became troublesome; and about the same time, to the best of his recollection, he first found himself obliged to get up once or twice in the night-time to pass urine; but he had no pain in the loins, dysuria, or other collateral uneasiness. In the middle of March he first observed œdema of the face and legs; which, however, never became considerable. After this he took diuretics, although the urine was never scanty; but he remarked that such diuretics as he employed were apt to occasion diarrhœa instead of acting on the urinary secretion. Towards the end of April he repaired to Edinburgh for advice, when I saw him along with Dr Abercrombie and Sir George Ballingall.

The countenance and whole integuments were remarkably pale and leucophlegmatic. There was some œdema of the legs and hands, and a little puffy swelling of the face. The sickness and vomiting in the morning recurred regularly. The urine amounted to five pounds daily, was paler than natural, had a density of 1011.5, and yielded an abundant flaky coagulum when heated. For some time before he left home the pulse had been natural; but subsequently to his arrival in Edinburgh it had become frequent and hard, with heat of skin, anxiety of expression, and hurried, somewhat labouring respiration, without pain or cough. This febrile affection was only of eighteen hours standing, and was ascribed to exposure to cold in a chill morning. Percussion of the chest everywhere elicited a clear sound, except in the region of the heart, where the dulness was more extensive than usual, especially under the lower half of the sternum. There was no crepitation or sibilant sound to be observed by the ear or stethoscope. There was some roughness and prolongation of the first sound of the heart, approaching the bellows' murmur, and its impulse was strong and jarring; but the apex pulsated distinctly between the fifth and sixth ribs.

As the breathing was obviously much oppressed, and he felt assured that another pleuritic attack was forming, like those he had laboured under formerly, he was cautiously bled from the arm to the amount of twelve ounces. He experienced in consequence very great relief in his breathing, passed a better night afterwards than he had done for three months, had no sickness next morning or any other particular uneasiness, and felt decidedly stronger. There was less œdema, the pulse had become 72 and soft, the respiration slow and easy, the skin cool, and the impulse of the heart moderate as well as free of any unnatural concomitant sound. He was directed to take a drachm of bitartrate of potash thrice a-day, and to be moderate for some days in the use of food. The diuretic however occasioned watery diarrhœa, and was therefore discontinued, more especially as the urine continued abundant, and the œdema was gradually disappearing. In six days after his arrival in Edinburgh he was so well as to be able to return home, a distance of sixty miles; and he stood the journey easily. His friends were assured however that he could never again engage with safety in the exercise of his profession, that he would require to live constantly the life of a valetudinarian, and that it would be necessary for him to avoid carefully all exposure to cold, and to watch diligently for any renewal of his inflammatory attacks. He continued under these injunctions to enjoy very fair health till the beginning of June, six weeks after I saw him, when he was again seized with symptoms of pleurisy or pneumonia, which proved fatal in seven or eight days. The particulars I have not been able to learn; and unfortunately the body was not examined.

The blood which was drawn during his visit to Edinburgh presented a strong buffy coat, a scanty, contracted crassamentum, and a very abundant, slightly lactescent serum. It was analyzed by the second of the processes detailed in page 65. The serum had a density of 1018.5 and contained only 6.16 per cent of solids. In 10,000 parts of blood there were 491 parts only of hæmatosin, 583 of solids of the serum, and 56 of fibrin. Five hundred grains of serum evaporated to dryness, and treated as described in page 62, gave a fluid which yielded an abundance of pale pearly scales with nitric acid.

REMARKS.—The most interesting facts in this case are the exceeding tendency to pleuritic inflammation, and the diseased condition of the blood. Neither must I omit the circumstance, that the patient, himself a medical man, was attended for many months by a professional friend in the country; and yet the true nature of his illness, at least its primary cause, was long unsuspected. The want of an inspection of the body prevents a very positive decision as to the class of cases among which that of Mr M. should be arranged. But the condition of the blood and of the urine show that the affection of the kidnies must have been very far advanced. The incidental occurrence of acute inflammatory symptoms and general reaction must have increased the density of the urine by throwing into it a large quantity of albumen; yet even with this addition the density was only 1011.5, which, I have said, characterizes the advanced stage of granular disorganization; and the excessive reduction of the hæmatosin of the blood, namely to one-third the healthy proportion, cannot be referred to the blood-letting practised eighteen months before, but is much better explained on the supposition of long-continued and advanced disease in the kidnies. The abundance of albumen in the urine corresponds with its scantiness in the blood, which contained scarcely five-sevenths of the healthy quantity of that principle. The presence of a considerable quantity of urea in the blood is a somewhat anomalous fact, considering that the urine was secreted in large quantity. The absence of any affection of the head notwithstanding that the blood was, so to speak, poisoned with urea, is a fact which I have repeatedly had occasion to remark in the advanced stage of granular disorganization of the kidnies, but never in its early stage. Blood-letting ought always to be practised with reserve in advanced disease of the kidnies, as the blood is already greatly impoverished; and this case shows that in using it in such circumstances much may be accomplished by little.

XV. Anasarca : Catarrh : Chronic Rheumatism. Death from Catarrh and Pleurisy. Kidnies in an advanced Stage of Granulation. Urea in the Blood.

Nancy Burns, aged 25, a woman of dissolute life and intemperate habits, became a patient in the Infirmary under the care of the late Dr James Gregory in the end of January 1829, on account of dropsy. She had œdema and ascites of four months' standing, preceded by amenorrhœa for six months. She complained of dyspnœa, severe cough and general rheumatic pains. She was extremely leucophlegmatic. After being repeatedly bled from the arm the pectoral symptoms abated. Subsequently it was remarked that the urine was abundant, very pale, and slightly coagulable by heat. In a month she was dismissed nearly well, the urine continuing in the same condition.

In July she was again admitted into the Infirmary and came under my care. Her chief complaints then were general rheumatism of the joints, and some return of œdema. The leucophlegmatia was greater perhaps than I have ever again witnessed. The œdema, which was not considerable, soon disappeared under the use of bitartrate of potash; and in a month she left the hospital a second time free of secondary affections. During this second illness the urine was several times carefully examined and once analyzed. At a time when only thirty ounces were passed daily, it had a density of 1006.9, was exceedingly pale, almost indeed colourless, became hazy with heat, and contained only fifteen parts per thousand of solid matter, of which 11.6 were urea and lactates. On one occasion she was cupped over the loins for pain there, when the urine was in the state just described. The circumstances being thought favourable for the detection of urea, the serum of the blood was analyzed in the usual way; and the watery extract ultimately obtained became on the addition of nitric acid a mass of numerous pearly scales.

A third time this patient was admitted into the Infirmary for similar complaints, namely in the middle of October of the same year, when she came under the care of Dr Gregory. Her complaints now were slight œdema of the legs, pain in the lower part of the chest and in the epigastrium, hard cough, scanty, difficult expectoration, and much dyspnœa. Catarrhal râles were heard over the whole chest, and the sound on percussion was generally dull. The urine was scanty, higher-coloured than formerly, strongly coagulable, and 1010.5 in density. The pectoral symptoms soon became urgent; venesection gave her no relief; the pulse became slow, weak, and frequent; the dyspnœa quickly increased; and death ensued two days after her admission.

INSPECTION.—There was a considerable quantity of turbid serum in both sides of the chest; and over both lungs a thin layer of recent lymph, with some adhesions to the costal pleura. The bronchial tubes on both sides were gorged with mucus, and vascular. Both lungs were much infiltrated with serum. The left ventricle of the heart was in a state of hypertrophy without dilatation. The aortic valves were somewhat cartilaginous at the base. Both kidnies were much altered by the deposition of yellowish granular matter, which entirely occupied the place of the cortical structure, and materially encroached also on the tubuli uriniferi. There were also several cysts in the kidnies. The liver was not examined.

REMARKS.—The case of Burns has been already published by Dr Gregory; and was also previously noticed in my own paper. I have combined the two notices here, because it forms an apt and succinct illustration of the very temporary nature of the cures of the secondary affections, which are accomplished in the instances of the intemperate, more especially where the disease of the kidnies is far advanced. That the disease was far advanced even on the first occasion seems probable from the condition of the urine, which was pale and but slightly coagulable; and this inference is farther borne out by the extreme degree of leucophlegmatia.—There was here a great complication of secondary disorders,—catarrh, rheumatism, dropsy, pleurisy; and the dropsical effusion was the least important of them. The urea discharged daily scarce amounted to a fifth part of the healthy average, and it was therefore found unequivocally in the blood,—as it will always be in similar circumstances if searched for skilfully. This was one of the first instances in which I detected urea in the blood of persons labouring under granular disorganization of the kidnies.

XVI. Enlargement of the Heart: Catarrh: Excessive anasarca, with effusion into the cavities: Erythema subsequent to acupuncture, followed by fatal gangrene. Kidnies in a rather advanced state of granular disorganization.

Jane Kelly, a married woman, aged 47, of large frame, and reported regular in her habits, had been subject for years to some dyspnœa and slight œdema of the ankles on unusual exertion. In March 1836, after exposure to cold and wet, the catamenia were suddenly suppressed during their flow, when she was attacked with pain in the loins and lower belly, scanty, painful micturition, increased dyspnœa, and soon afterwards with much œdema of the limbs, paroxysms of asthma during the night, fits of palpitation, cough with viscid sputa, dizziness, weight, and pain in the head, thirst and loss of appetite. Seven weeks after this attack, when she was admitted into the Infirmary, the œdema was very great, and she had all the other symptoms just mentioned. There was dulness on percussion in the whole left side, and in the lower part of the right also, with loud sibilant and sonorous respiration over the whole chest instead of the natural respiratory sound; and the action of the heart was heard and felt feebly, though the sounds were otherwise healthy. The urine was scanty, sometimes so low as fourteen ounces in twenty-four hours, of the density 1014, distinctly coagulable by heat, nitric acid, and corrosive sublimate, but most of all by heat. There was no trace of any affection of the liver, and she never had jaundice. Under the use of the tincture of lobelia in drachm doses the asthmatic paroxysms were subdued; and the occasional administration of gamboge, with the regular use, first of squill and calomel, then of digitalis, and next of the infusion of broom-tops with digitalis, produced free watery diarrhœa and copious discharge of urine, by which a considerable reduction was accomplished in the œdematous swelling of the trunk, face and arms. The urine varied singularly in quality during this treatment, being one day 1030 in density and very coagulable, when its quantity was three pounds, next in two days 1014 and scarcely coagulable, and again a week afterwards 1012, and more coagulable when its quantity was five pounds.

In the middle of June, when I first took charge of this patient, she passed eight pounds of urine daily and had a constant watery diarrhœa without pain. The dyspnœa had materially abated. There was still excessive, tense œdema of the legs, and much ascitical enlargement of the abdomen. Suddenly however, without any change in the treatment, the urine fell to only fourteen ounces, and acquired much greater coagulability, as well as the high density of 1033; and at the same time the mouth became slightly mercurialized. All the previous remedies were therefore abandoned; bitartrate of potash was given in divided doses to the amount of ten drachms daily, and gin was ordered on account of her extreme state of exhaustion. The diuretic however caused troublesome diarrhœa, the gin occasioned headache, so that both were abandoned, and tincture of digitalis was resorted to. But as the tension of the limbs became rapidly excessive, and the œdema extended again over the whole body, producing a great increase of dyspnœa, it was also thought indispensable to puncture the limbs; which was done in various parts of both legs with the acupuncture needle. A clear fluid was steadily discharged in large quantity from the punctures, which were so minute as to be thus only discoverable; and in two days the urine increased to five pounds, and soon afterwards to sixteen pounds daily,—its density varying from 1022 to 1015, and its coagulability continuing considerable. Before the diuresis commenced a great diminution took place in the œdema and all the symptoms connected with it; and the improvement went on steadily afterwards. The supervention of faintness and slowness of the pulse rendered it necessary soon to abandon the digitalis, and to administer wine liberally. Four days after the punctures were made redness appeared first in one leg, and then in the other also, not however in the exact seat of the wounds,—of which too scarcely a trace could be detected except by the drops of serum exuding from them. At first the redness was checked by a lotion of four grains each of acetate of lead and of opium to an ounce of water; and from one leg it gradually disappeared with desquamation. But in the other it extended quickly and was attended with much exhaustion and general irritation, a tendency to diarrhœa, occasional sweating, and some increase of the pectoral complaints; in ten days vesication appeared; blackness and extensive gangrene ensued; and on the 7th July, the thirteenth day from the appearance of the redness, she died. During the progress of this affection, the urine continued steadily about eight or nine pounds in quantity, about 1024 in density, and for the most part slightly coagulable. The œdema nevertheless did not materially diminish in the legs, and for some days before death rather gained ground upon the trunk and face.

Inspection.—Four days after death. The body was in a state of considerable decomposition. In each cavity of the pleura there were about five pounds of red serum, without any fibrin in it, or on the membrane. The lungs were healthy. The cavities of the heart were much enlarged, especially the right ventricle, and the right auriculo-ventricular opening. The cardiac valves were free of disease, except that a few grayish-red vegetations were seen at the junction of one of the aortic valves with the vessel, insufficient to obstruct its valvular function. The inner coat of the aorta presented numerous yellowish indurated patches; and one small speck had passed to ulceration round its margin. The parietes of the heart were not thickened.—The liver was rather pale, friable, of natural size, and also in other respects healthy. The kidnies were considerably less than usual, one of them not above half its ordinary size. Their surface presented several depressed grooves, like scars, and was rough, granulated, and gray in colour. On a section being made the cortical texture was seen to be very narrow, quite destitute of its proper fibrous appearance, and entirely composed of an obscurely-granular grayish-yellow matter. The same matter occupied the interstices of the tubuli uriniferi, appeared to have compressed them so as to render them much more finely fibrous and narrower than in the healthy state, and in the centre of one kidney filled completely a space of the size of a half crown, so as to have destroyed at least one tubulus.

Remarks.—The course of the symptoms is here characteristic of those comparatively rare instances of the disease in the kidney, where the predominant secondary affection from first to last is dropsy. Why the tendency to dropsical effusion should be so very great in some, and so inconsiderable in others to appearance similarly circumstanced, it is impossible as yet to explain. But in the present case the tendency was obviously very great, since the œdema latterly remained unsubdued, though the urine for many days was at least thrice as abundant as in health, and likewise of considerable density.—The high density of the urine observed throughout most of the course of the disease is an anomaly, considering how far the organic derangement of the kidney had advanced; and I have indeed never met with any case of the kind but this.—Contrary to the general principles advocated by some, there was at one period extensive ascites, though the liver was sound.—The state of the heart seemed inadequate to account for the chest symptoms under which the woman had long laboured. I had expected to find emphysema of the lungs to account for them; but the appearances in the lungs did not correspond with the signs elicited by auscultation on her first admission into the hospital. The most probable cause of the dyspnœa, asthma, and palpitation, was the enlargement of the right auriculo-ventricular opening, with which the size of the tricuspid valve did not altogether correspond, so that its valvular function was probably not performed in a perfect manner.—It has been lately held that acupuncture in anasarca is not apt to be followed by cutaneous inflammation, as in the instance of punctures by incision. This woman's case rather contradicts that doctrine, and I had a similar instance to the same effect at the very same period in the case of a man affected with excessive anasarca in connexion with disease of the heart. There can be no question however that acupuncture is a much safer method for evacuating the fluid of distended limbs, and not less effectual, than the method by scarification. And in regard to the case of Kelly, it is not impossible that the erythema was the result, rather of the long-continued distension, than of the acupunctures; for it did not commence anywhere near the punctures, and not till four days after they were made.—The tincture of lobelia gave marked relief from the asthmatic paroxysms, and I have met with repeated instances of the same good effects from it, where the paroxysms were connected with emphysema of the lungs, or with diseased heart. In some cases, where the lobelia was alternated with the more familiar antispasmodic draught of ether and morphia, the patients preferred the former, both on account of its immediate action, and likewise because it left no uneasy feelings next morning, and no tendency to constipation. In other cases again the lobelia had little effect where the ether and morphia draught was successful; but such cases have been rare.

XVII. Anasarca and Ascites. Indigestion, with tendency to Chronic Vomiting. Temporary recovery under Diuretics. Return of Secondary Affections. Death from gradual exhaustion. Blood defective in Hæmatosin.

Catharine Robertson, a married woman, 56 years of age, tall in stature, infirm in health, and reported not intemperate in her habits, was admitted into the Infirmary in the beginning of May 1838, on account of dropsical complaints. She had a similar illness twelve months before, but recovered thoroughly. Before admission she had been four months ill with the same complaints which she then presented, namely considerable œdema of the legs, some fulness of the abdomen, cough and dyspnœa, scanty coagulable urine, and a dingy bloodless complexion. Under the use of diuretics, especially the decoction of broom-tops, the œdema and ascites were almost entirely removed before the end of May, so that she was able to be out of bed nearly all day; when she was again confined from the effects of a severe burn. When I took charge of her in the middle of June she was supposed to suffer only from the consequences of the burn, of which she was quickly recovering. But the anasarca soon began to reappear, and on the 22d June there was considerable pitting œdema of the legs, much fulness of the abdomen, some dyspnœa,—yet with a discharge of five pounds of urine daily of the density 1008, and slightly coagulable by heat as well as nitric acid. Thinking the purgative plan the preferable treatment, I ordered gamboge every other morning, and the warm-bath every other evening as a diaphoretic. For nearly two weeks she did well so far as the dropsical effusion was concerned; but the amendment was very gradual and slow. At length on the 7th of July, when the œdema had almost disappeared, it suddenly and quickly increased, so as to affect the arms and face as well as the legs. At the same time she was attacked with frequent, tickling cough, and shortness of breath, which compelled her constantly to sit in bed; the pulse became frequent and firm; the skin felt rather hot and dry; and the urine was about thirty ounces only, 1017 in density, and more strongly coagulable. She was so emaciated, however, and so exhausted that I was averse to resort at once to venesection, which seemed otherwise to be indicated; and therefore a grain of digitalis with the same quantity of squill was given three times a-day, and likewise six drachms of bitartrate of potash in divided doses. On the 11th July, no material impression being made on the symptoms, croton-oil was given twice with the effect of occasioning watery stools and some increase of urine. But on the 15th, as no material amendment had taken place, she was bled from the arm to twelve ounces. From this treatment she experienced much relief to the dyspnœa; and the urine increased from three to five pounds. The blood separated into a large, loose clot, and a scanty serum; its serum had a density of 1019 and slight lactescence; and it was composed in 10,000 parts of 34 fibrin, 634 dry solids of the serum, 916 hæmatosin, 8416 water. The urine at this period, when three pounds in quantity, was 1015 in density, nearly natural in colour, and but moderately coagulable. There was not the same improvement subsequently which had been looked for, considering the marked change after the bleeding. The urine continued moderate in amount upon the whole, though occasionally scanty. But the œdema remained permanent, and the abdomen continued full; the appetite fell away, and she had frequent sickness, with occasional vomiting; the emaciation and debility also gained ground; and little advantage was derived from the use of diuretics. There seemed to me also unusual dulness in the region of the liver upon percussion; although this could not be satisfactorily determined on account of the ascitical enlargement. For three weeks after she was bled, she either took very little food or rejected what she did take; the exhaustion quickly increased; and about the beginning of August she died, without any marked change in the symptoms, and without the formation of distinct coma.

Remarks.—An inspection was unfortunately not allowed here. It was certainly necessary to clear up some particulars of the history. The urine was not of the very low density usually observed in the advanced stage of granular disintegration of the kidnies. The state of the blood gave similar indications, for the hæmatosin still amounted to sixty-five per cent of the healthy proportion. We can scarcely suppose therefore that the primary disease in the kidnies was so far advanced as to account singly for the patient's great prostration and emaciated state, and the feebleness of the restorative powers of nature. The probability was that she also laboured under chronic disease of the liver; for, although there were no prominent symptoms of its presence, this would account best for the particular manner of death, as well as for the circumstance that the ascites always formed a prominent part of the dropsical accumulations.

XVIII. Symptoms of granular disorganization of the Kidnies, without any secondary affection. Considerable amendment under local evacuants, counterstimulants, and opium.

Catharine Murray, aged 28, a widow, was admitted under my care into the Infirmary in January 1831 for urinary complaints of twelve months' standing. Every ten minutes she was seized with severe pain in the back of the pelvis, compelling her to evacuate the bladder. She was much emaciated and exhausted, yet had a good appetite and digestion. The catamenia, long irregular, had ceased entirely for seven months. The urine varied from 64 to 96 ounces daily, was sometimes deeply tinged with blood, had a density of 1014, and coagulated moderately with heat. She never had dropsy. The bladder was sounded without any indication of stone. Leeches were applied frequently to the loins, and afterwards a caustic issue, while opium suppositories and laxatives were given regularly. The pain and frequency of micturition were thus somewhat diminished. In the middle of February the catamenia reappeared, without change in the symptoms, except that the urine became much more coagulable. Frequent rigors occurred after this, but without febrile accessions supervening. It was now thought desirable to try the effect of mercury; and she got a grain and a-half of calomel three times a-day. But mercurial fœtor appeared with the fifth dose, the jaws began to swell greatly, violent salivation quickly set in, and she was threatened with all the accompaniments of formidable mercurial erethysm. Under large doses, however, of acetate of lead internally, and leeches to the jaws, these symptoms gradually and speedily subsided. Micturition was now reduced to once every hour, the urine was from 48 to 72 ounces daily, bloody-coloured, very coagulable, and 1014 in density. In the beginning of March, when mercurial action had ceased, the urine was 32 ounces in quantity, strongly coagulable, and passed with less pain and only once every other hour. From this time she was able to leave her bed, and began to recover strength. Towards the end of March, the urine continued natural in quantity, 1012 in density, and very coagulable. My turn of service ended with March, and subsequently an imperfect account was kept of her case, as she was handed over to my successor as a convalescent. She improved gradually however; and in the middle of June left the hospital for Glasgow.

Remarks.—This case is transferred from the paper of Dr Gregory, to whom I communicated it, as an instance of disease of the kidney, to all appearance unaccompanied by a single secondary affection. In compensation as it were for this exemption, the patient laboured under the proper signs of disease of the kidnies in the most aggravated degree; and for this reason too I have admitted it here, to show the nature of the essential symptoms of the primary disorder. The morbid deposition would seem from the nature of the urine not to have made very great progress. That the case was correctly treated by local evacuations and anodynes, will appear sufficiently from the result; but it may be thought, and with reason, that the use of the warm-bath and of diaphoretics internally should have been conjoined with these remedies. It was clearly one of the cases where the disease of the kidnies is associated with unusual sensibility to mercurial action; and the heedless use of mercury would have been fraught with the most harassing consequences. I have met with repeated instances besides this where mercurialism threatening to break forth with excessive violence was subdued by leeches and acetate of lead according to the method recommended by Mr Daniel. Forty grains of acetate were taken daily.

XIX. Essential symptoms severe: very slight secondary affections. Disease of the Kidneys probably in the early stage. Recovery under local evacuations and diuretics.

Catharine Keith, aged 30, married, was subject for two years to dyspepsia, dysuria, piles and slight occasional œdema. In the end of November 1829 she was admitted into the Infirmary and came under my care. She complained of pain in the loins and across the stomach, increased by eating, and relieved by vomiting, to which she was subject. She had a small, frequent pulse, considerable emaciation, but no œdema. She occasionally passed no water for twenty-four hours, and for some days no more than four ounces daily; which was for some time not examined, as the catamenia were flowing. On the 2d December, after a fit of acute lumbar pain, she passed a considerable quantity of blood by the urethra, which coagulated loosely; and for two days more the discharge from the bladder seemed to consist fully more of blood than of urine. The hæmaturia was attended with considerable relief to her symptoms. On the 5th the urine was pale cherry-red, slightly muddy, very coagulable, 1010 in density, and still below the healthy standard in quantity. During this period leeches were applied to the loins, and blood was also drawn by cupping: squill with opium was administered; and rhubarb with magnesia was frequently prescribed as a laxative and antacid. The urine afterwards slowly increased in quantity and lost much of its coagulability; till on the 14th December it amounted to thirty-two ounces, was nearly natural in colour, became hazy only when heated, and had risen in density to 1017.5. On the 21st, there were twenty-four ounces passed, which had a density of 1025, and had entirely lost all appearance of coagulability. About this time the ankles became slightly œdematous towards night; but this affection, which varied with the amount of the urine, never became considerable. Digitalis was now tried along with the squill, at first with no benefit, for the urine again fell to a few ounces per day. Mercury was also tried in small doses to aid the diuretics; but it was promptly abandoned on signs of mercurial action beginning to show themselves in five days. The lumbar pain and dysuria having returned with the diminution of urine, the loins were thrice cupped, with evident advantage; and on the addition of bitartrate of potash to the digitalis and squill the urine gradually increased in quantity from eight ounces to six pounds, and in density from 1010 to 1030. At one time the bloody colour returned, and along with it the coagulability. Towards the end of March her general health had greatly improved; the dyspeptic and urinary symptoms had disappeared; and the urine was natural in quantity, 1025 in density, and not coagulable. Diarrhœa, to which she was subject for two months after her admission, apparently in connexion with the dyspeptic complaints, was eventually removed. In the beginning of May she was dismissed free of complaint.

REMARKS.—Like the preceding case, the present one is remarkable for the great severity of the essential symptoms of disease in the kidneys, together with the comparative slightness of the secondary affections,—affording in these respects a singular contrast to the generality of the cases recorded in these pages. The particulars fully bear out the opinion that the woman laboured under that pathological condition of the kidneys which tends to granular deposit. It was not a case of mere hæmaturia ; for otherwise, according to what has been observed in hæmaturia without granular disease, the urine would have ceased to contain albumen as soon as it ceased to present the colour of blood. It is probable that the disease was in its early stage. In this view however, the very low density of the urine immediately after the hæmaturia seems an anomaly ; for in the early stage the density of the urine in all other cases I have examined has been very little, if at all, reduced. Still, explain this fact as we may, the gradual restoration of the healthy density, and that too under an increase of quantity, is sufficient proof that the defective secretion at first was owing to functional causes only, and that no material disorganization had taken place in the secreting apparatus of the kidneys.

This, as well as the preceding case, shows the value of local remedies where the symptoms draw the physician's attention in time to the true primary disorder. Both likewise illustrate the occasional risk of employing mercury, and the necessity of invariably watching its progress with jealousy. Farther the case of Keith proves, with many others in the present list, that diuretics are not necessarily injurious in granular disease of the kidneys; that their action may be attended with the removal, instead of the increase, of all those properties of the urine which are considered characteristic of the peculiar morbid tendency, namely defective secretion of urea, discharge of blood, and separation of albumen; and consequently that the doctrine of some recent writers who proscribe diuretics requires revision. May it not be inferred from this and other cases, that the irritation produced by diuretics is different in kind from that which attends granular deposition? May it not even be plausibly reasoned that the one species of irritation is in some circumstances incompatible with the existence of the other?

XX. Anasarca: tendency to Chronic Vomiting: Disease of the Kidnies probably in its earliest stage. Blood loaded with urea, and not defective in hæmatosin. Recovery from the secondary diseases.

Archibald Wright, a tall, rather robust mason, 55 years of age, and reported of temperate habits, was admitted on the 26th June 1838 into the Infirmary on account of anasarca. He had anasarca twenty years before over the whole body subsequent to an accident, and again five years before the present attack consequent on unusual exposure to cold and wet. On both occasions he was freely bled, and recovered entirely. He enjoyed very good health till the 17th of June, when, after having worked all day in very wet weather, he was attacked in the evening with shivering and headache, and in two days with swelling of the face, hands, legs, and abdomen. On his admission on the ninth day of his illness there was considerable fulness, tenderness and fluctuation of the abdomen; considerable pitting œdema of the legs; a somewhat frequent, full, and incompressible pulse; a moist, furred tongue, with much thirst; a hot, dry skin; and scanty urine, not exceeding twelve ounces in twenty-four hours, brown, muddy, of acid reaction, 1024 in density, and convertible into a uniform, transparent jelly by heat. He had no dysuria or frequency of micturition, no pectoral complaints, no affection of the heart, no appreciable disorder of the liver. He was immediately bled to twenty ounces, ordered five grains of gamboge, and directed to have the warm-bath every other evening. The blood was not buffy. The serum was slightly lactescent, 1021 in density, and abounding in urea, which was obtained by acting on the powder of the dry serum with boiling absolute alcohol, driving off the alcohol, dissolving the residue in water, filtering and concentrating the solution, and then adding nitric acid. The composition of the blood was in 10,000 parts 30 fibrin, 548 dry solids of the serum, and 1339 hæmatosin. The urine after the bleeding no longer gelatinized, but gave a most abundant flaky precipitate with heat, which was found to constitute 2.7 per cent of the secretion.

He experienced much relief from the loss of blood; and at first the baths and purgatives increased the urine, occasioned some sweating, and produced a decrease in the dropsical swellings. On the 1st July the urine was 1025 in density, pretty abundant, and considerably less coagulable. After this the urine suddenly fell to only eight ounces, and the œdema began to increase again; and little benefit was obtained from repeated doses of gamboge, which brought on besides a tendency to vomiting, even though given with aromatics. On July 7th the urine was 24 ounces, cherry-red, muddy, slightly coagulable by heat and nitric acid. Blood was now withdrawn from the loins by cupping, and acetate of ammonia ordered repeatedly throughout the day; while the cathartic plan was abandoned. The acetate did not act as a diaphoretic, but rather as a diuretic, occasioning the discharge of six pounds daily, of the density 1018, and again strongly coagulable. The œdema however increased, the vomiting returned and became troublesome, and a tendency to diarrhœa manifested itself. On July 11th he was again bled, with much relief; and a mixture of acetate of potash, bicarbonate of potash and cinnamon-water was substituted for the acetate of ammonia, as the diuretic method seemed the most promising line of treatment. The œdema decreased rapidly; the urine increased to nine pounds; and the vomiting ceased. On July 15th the vomiting returned with violence, both after meals, and independently of them; but it was checked by a drop of creozote in an ounce of cinnamon-water thrice a-day, and by the discontinuance of the diuretic mixture. From this time he went on tolerably well, though with occasional attacks of diarrhœa till July 27th, using the warm-bath, and taking eight grains of Dover's powder daily. The urine was very regularly seven pounds daily, very coagulable, and 1017 in density. The fulness of the abdomen was now nearly gone, and the œdema inconsiderable. On August 9th when I ceased to have charge of him, the Dover's powder was abandoned, as it occasioned sickness, and there was little œdema remaining. He continued to pass eight or nine pounds of urine daily. Dr Traill, who succeeded me in the clinical ward, gave him the decoction of broom-tops, by which the urine was for some time doubled in quantity. On September 4th, as he complained of pain in the loins, blood was withdrawn by cupping, and with good effect. On September 9th he was dismissed at his own desire. When I saw him then he was leucophlegmatic, but free of œdema and fulness of the abdomen, stout and active. The urine was about ten pounds daily, 1015 in density, and still very coagulable.

Remarks.—This case presents all the evidence it is possible to have of granular derangement of the kidnies having been in its earliest stage only. Independently of the mere narrative of the circumstances before he came under medical treatment, the urine was characteristic of this stage, being high in density as well as very strongly coagulable; and above all, the blood had lost scarcely any of its colouring matter, an alteration which I have hitherto found invariably proportional to the duration of the renal disease as established either by the history of the symptoms or the appearances after death. The hæmatosin constituted 1339 parts in 10,000, which is often enough observed to be the proportion in healthy blood. The only marked deviation of the blood from the healthy standard was the diminution of its albumen, which was reduced by about thirty-five per cent. This deviation was obviously connected, as it always is found to be, with the secretion of a great quantity of albumen from the urine. I have never found so large a proportion of albumen in the urine as in the present case, the proportion namely of 27 parts in 1000.—There was here a very unusual absence of local symptoms in connexion with the kidnies: Even frequent micturition was wanting, a rare circumstance in the early stage of acute cases.—We see here, as in most instances of dropsy in the early stage of the primary disease, that diuresis does not by any means promptly remove anasarcous effusion, that the effusion will for some time resist the influence of a very free discharge of urine, and that no substantial improvement may be attained without time and perseverance.—Wright's case seems to have been a clear instance of cure or suspension of the disease for a considerable term of years. The general dropsy of 1833 could scarcely have been any thing else than that kind which is associated with granular degeneration of the kidnies in its early stage. And the man's perfect health between that and the summer of 1838, as well as the state of the urine and of the blood on the latter occasion, is convincing proof that the primary disease could not have made progress in the interval.

XXI. General Dropsy without any other secondary affection. Disease of the Kidnies probably in the early stage. Recovery under Diuretics.

James Cunning, aged 62, a stout blacksmith, subject to slight rheumatism, otherwise a healthy man, and of temperate habits, was attacked with neuralgia of the right side of the face subsequent to exposure to cold and wet in March 1838; and a day or two afterwards he observed his legs and abdomen to swell, while he also became affected with difficult breathing and palpitation. Ten days after seizure, when I first saw him, there was great œdema of the legs, much distension of the belly, some œdema of the arms, a little fulness of the features, and a rather leucophlegmatic complexion. He complained of dyspnœa, which prevented him from lying down, cough, pain in the right side of the face and head, and loss of appetite. The lower part of the right side of the chest, towards which side he commonly lay, was dull on percussion and without any respiratory sound; but elsewhere the respiration was distinct, and attended here and there with submucous or subcrepitant murmur. The pulse was 60, hard; the skin warm and moist; the urine about twenty-four ounces daily, straw-coloured, of the density 1022, and slightly coagulable by heat and nitric acid. Blood was twice drawn from the arm, to 22 ounces in all, and with relief each time to the breathing. Ten minims of tincture of digitalis with twice as much tincture of squill, were given every six hours, also two drachms of bitartrate of potash thrice a-day, and an antispasmodic draught of ether and morphia at bed-time. For five days no increase took place in the urine, or any material amendment of the symptoms. But after brisk purging from five grains of gamboge, diuresis suddenly set in; from 72 to 120 ounces were passed daily of urine, varying in density from 1020 to 1015, and slightly coagulable as before; under this state of matters every symptom steadily receded; and in four weeks from the commencement of diuresis there was no œdema, dyspnœa, or any other complaint left. At the close of this period the coagulability of the urine ceased; nor did it reappear during twelve additional days that he remained under my observation. The urine continued abundant for three weeks after diuretics were abandoned; but was decreasing when I ceased to see him. It was for a few days pale cherry-red.

Remarks.—From the character of the urine, as well as the history of the present case, this appears an instance of disease of the kidney in the early stage. I regret I omitted to test this probability by an analysis of the blood. The occurrence of such extensive dropsical effusion with so slight derangement of the urinary secretion is unusual. Judging from the small proportion of albumen in the urine there must have been less than usual of that irritation of the renal vessels which characterizes the disease, especially in its early stage; and there was a moderate proportion of urea excreted.—Conformably with the slight albuminous impregnation of the urine, the serum of the blood proved to abound in albumen, its density being 1029.—The marked dyspnœa in this case was owing partly perhaps to œdema pulmonum, but chiefly in all probability to the distension of the abdomen.—The effect of a hydragogue purgative in bringing on the action of diuretics was well marked; and I have met with frequent instances of the like kind.—The whole circumstances argue strongly against the supposed unfitness of diuretics in renal dropsy. For here, as I have witnessed in other cases, under the use of diuretics the albumen not only did not increase, but actually disappeared from the urine; showing, as appears to me, that the irritation which causes diuresis is not of the same kind with that which occasions the peculiar secretion of the early stage of granular disorganization.

XXII. Anasarca and Ascites without any other marked secondary affection. Disease of the Kidney probably in a rather early stage. Recovery under diuretics.

Jean Wood, an unmarried woman, of slender frame, and 33 years of age, had a tedious attack of rheumatism in 1834, and eighteen months afterwards a feverish attack, with cough and pain of the side, consequent on exposure to cold and wet while employed as a reaper at the harvest. Six months later she remarked her legs begin to swell, after which she was troubled with frequent micturition and occasional cough. When she had been a month ill she was admitted into the Infirmary under Dr Traill, early in June 1836. She had much distension of the abdomen, considerable, white, tense swelling of the legs, dyspnœa, cough, want of sleep, and also, as she said, a tendency to diarrhœa. This tendency however was not shown subsequently. The urine was pale, not diminished in quantity, 1010 in density, and considerably coagulable. She was ordered half a grain of calomel every evening, and first squill, and then decoction of broom-tops, as diuretics. The latter she took to the amount of two pounds daily, with two drachms of bitartrate of potash dissolved in it. Under this system the urine quickly increased; and when she came first under my care on the middle of June, there was no swelling of the abdomen, no dyspnœa or cough, little remains of œdema, and a copious flow of pale, very slightly coagulable urine, 1008 in density. Towards the close of June mercurial action was faintly developed, upon which the calomel was abandoned; and the mouth never became worse, but on the contrary got well in six days. Two days after the discontinuance of the mercury, the œdema being confined to a little fulness of the ankles at night, and the urine having become less abundant, more coagulable, and of the higher density of 1018, the decoction of broom-tops was discontinued, and diaphoretics were substituted, namely the acetate of ammonia frequently in the course of the day, and Dover's powder at bed-time. Early in July there was no œdema even towards night under exercise, and the patient was strong and had no complaint. She was therefore dismissed. The urine was then rather more copious than natural, 1013 in density, and somewhat, though much less, coagulable.

Remarks.—The case of Wood agrees in most particulars with that of Cunning last described. It is an example of the removal of extensive dropsical effusions under the use of diuretics, without any apparent increase, on the contrary rather with a diminution, of that particular variety of renal irritation which attends granular disease of the kidneys;—proving that diuretics may not be so incompatible with that disease as Dr Osborne and others imagine.—It likewise shows that mercurial action may be induced sometimes with safety in this disease, notwithstanding that there is in some cases a peculiar tendency to violent erethysm.—I could never detect here any signs of disease in the liver, notwithstanding the extent of the ascitical effusion.—It is not easy to say from the data in what stage the primary disease was. The whole circumstances being taken into account, the probability is, that it was in its early stage; and that the low density of the urine generally observed,—for on one occasion it was so high as 1018,—arose from such being its natural condition, as is well known to be the case with some persons.

XXIII. Anasarca, without any other marked secondary affection. Disease of the Kidnies in its early stage. Recovery under Diuretics.

Duncan Macnab, a night-watchman, a tall stout man, 35 years old, of regular habits, and on the whole of healthy appearance, was admitted into the Infirmary on account of dropsy in the beginning of April 1838. He had been attacked in January with cough and dyspnœa, consequent on exposure in the discharge of his duty during the unusually inclement weather which then prevailed. He did not quit his employment, however, till early in February, when his face, hands and ankles began to swell, and his urine became scanty. About a fortnight before his admission into the hospital he had to travel in harsh weather about fifty miles northward; and on his return, his complaints increased, and were also attended with pain in the loins as well as across the pit of the stomach, repeated fits of vomiting, and a tendency to looseness of the bowels. When I first saw him, he was free of pain, cough, dyspnœa, sickness and diarrhœa. There was elastic swelling of the legs and hands, puffiness and leucophlegmatia of the face, and thirst. The urine was towards four pounds daily, 1017 in density, clear when newly passed, and strongly coagulable by heat and nitric acid. The pulse was natural. No sign could be detected of any affection of the lungs, heart, or liver. About two years and a-half before, he had been subject to frequent micturition in the night-time, disturbing sleep; but this was for a short time only, and he had not lately observed any symptom of the kind.

I first tried with him Fowler's favourite diuretic, the tincture of tobacco, but without effect, for six days. Tincture of digitalis was then given for three days in the dose of two scruples daily, but also without effect. The œdema remained as before; and the urine continued about four pounds in daily quantity. Immediately however, after the brisk action of five grains of gamboge with a drachm of bitartrate of potass, diuresis set in; but it again ceased, in concurrence with symptoms of the narcotic action of digitalis, namely sickness, faintness, obscurity of vision, and very languid rather slow pulse.

The digitalis being discontinued, and these symptoms having gradually subsided, three drops of croton-oil were given along with fifteen grains of the colocynth pill in divided doses, with the effect of inducing copious watery discharges, and profuse diuresis. This was just three weeks after his admission. The diuresis was now easily maintained by two-drachm doses of bitartrate of potash thrice a-day; under which about twelve pounds of urine were passed daily, of the density 1016 and moderately coagulable. The œdema in consequence steadily and slowly diminished. In May he was transferred to the charge of my clinical colleague Dr Graham; under whom he continued gradually to improve, for three weeks longer, when he was dismissed at his own desire, nearly well. The urine continued never less than nine pounds.

REMARKS.—This is another case of simple anasarca, in connexion with granular disorganization of the kidnies. It is a good illustration of a general statement made in the body of this work, that dropsy may be formed, although the urine is not diminished below the natural standard in quantity, and that it is sometimes very slowly removed, even under continued free diuresis.—As in the case of Cunning, diuretics did not seem to act till the administration of a brisk purgative, after which diuresis set in profusely,—Another circumstance which deserves notice is, that the diuresis was not promoted, but on the contrary rather obstructed, by the digitalis having been accidentally carried so far as to excite its narcotic action. I have met with repeated instances of the same kind, showing that the diuretic action of digitalis, and its sedative action upon the heart and nervous system, are not at all connected with one another, but that on the contrary the sedative action is rather incompatible with its action on the kidnies. If in the administration of digitalis in dropsy it be given in such quantity as to sink the pulse, and to cause nausea, giddiness and depraved vision, diuresis is seldom induced till these symptoms have subsided; and I have seen diuresis, which had been brought on by small doses, cease on the doses being raised so as to act narcotically, and reappear as the narcotic symptoms wore off.

XXIV. Anasarca: Chronic Catarrh: Valvular obstruction of the Heart: Disease of the Kidnies probably in the middle stage: Blood poor in hæmatosin, and charged with Urea. Recovery under Blood-letting, Diuretics, and Cathartics.

James Mackenzie, aged 48, a street-porter, above the middle stature, robust in form, and of temperate regular habits,—after suffering for two months from headache and pain in the back, which were occasionally so severe as to keep him from his employment,—was attacked in the middle of January 1838 with general anasarca, and catarrh. Three weeks afterwards he was admitted into the Infirmary, where he came under my care. The anasarca affected the legs, face, and abdomen. He had cough with muco-purulent sputa, at times tinged with blood; dyspnœa, which prevented him from lying horizontally; and at night asthmatic paroxysms, accompanied by palpitation. There was loud sibilant and sonorous respiration everywhere, which obscured the sounds of the heart; natural clearness of percussion in respect both of the lungs and the heart; distinct bellows murmur with the first sound of the heart, but not attended by descent of its apex, or any material diffusion of impulse except in the epigastrium. The pulse was 72, full, and firm; and the functions of the stomach were undisturbed. The complexion was considerably leucophlegmatic. The urine was about twenty-four ounces in quantity, 1012 in density, and considerably coagulable by heat as well as nitric acid.

He was ordered a mixture of squill with ammoniated tincture of opium for the catarrhal symptoms, an antispasmodic draught of ether and morphia for the asthmatic paroxysms, and for the anasarca two drachms of bitartrate of potash thrice a-day, and three pills daily containing each a grain of squill with as much digitalis. No material amendment having taken place in five days, sixteen ounces of blood were withdrawn from the arm, and with relief to his pectoral ailments, but especially with great diminution of the catarrhal râles. Immediately afterwards the urine began to increase and the œdema to abate. After ten days of treatment, however, his appetite began to fail, and in the course of six days more he had nausea, giddiness, faintness, and occasional vomiting; while at the same time the urine fell to thirty-six and at length twenty-four ounces, and likewise became 1010 in density, and not coagulable by heat or nitric acid. The digitalis was therefore discontinued; and as he had at this time an unusually violent asthmatic fit, with severe palpitation, and a full hard pulse, I directed sixteen ounces of blood to be again taken from the arm. After this he experienced considerable relief to his pectoral complaints, and the urine again flowed pretty freely. In the beginning of March the diuretics were abandoned, as the œdema had almost disappeared. In the middle of March the urine was 32 ounces in quantity, 1014 in density, and still not coagulable; while all his complaints were greatly less. I then ordered him the warm-bath every other evening, and a pill thrice a-day composed of one grain of ipecacuan, half a grain of opium, and three grains of extract of hyoscyamus. The œdema however returned, and this too although the urine rose to sixty ounces daily. The tincture of digitalis was therefore ordered towards the close of March in the quantity of ten drops four times a-day in addition to the previous medicines; and under this treatment a steady flow of urine was maintained for a week to the amount of one hundred ounces daily, but without distinctly making an impression on the œdema. Gamboge was then administered; and afterwards he took every other morning two or three drops of croton-oil with ten or fifteen grains of the colocynth pill; under which treatment profuse watery stools were occasioned, and the œdema as well as pectoral symptoms were almost entirely removed. The patient was dismissed at his own request towards the close of April. At his departure there was scarcely any œdema, but distinct leucophlegmatia,—no cough, dyspnœa, asthma, or palpitation, but still distinct bellows murmur with the first sound of the heart,—and the urine was abundant, nor did it ever recover its coagulability during the last five weeks of his residence in the hospital.

REMARKS.—Judging from the history of Mackenzie's illness before he entered the Infirmary, one might be apt to suppose that the disorder of the kidnies was only in its incipient stage. But this inference is contradicted by his leucophlegmatic complexion, and by the low density of the urine. It is also at variance with the condition of the blood, which was examined on the second occasion at my request by Dr Charles Maitland, and found to be defective in hæmatosin. It was not buffy; its serum had a density of 1027.5, and contained urea; and its composition in 10,000 parts was 43 fibrin, 750 solids of serum, 955 hæmatosin, and 8252 water,*—being therefore tolerably natural except as regards the hæmatosin, which was reduced nearly thirty-five per cent. On the whole then it seems probable that the disease had been going on silently for some time before the anasarca appeared, and had reached its middle stage.—It seems a probable instance of arrestment of the progress of disorganization. It is plain from the state of the urine during the last five weeks that the irritation which excited the secretion of albumen by the kidnies had nearly or entirely ceased; while with this alteration a marked improvement took place in most of the secondary affections. It would be very interesting to trace the progress of such a case under a careful regimen. The probability is that it might be kept stationary for a long time.—It is particularly worthy of remark that the favourable alteration of the urine took place under the operation of diuretics;—an additional fact against the prevalent notion at present, that diuretics add to the mischief from the primary disease by increasing renal irritation.—The influence of the narcotic action of digitalis in arresting its diuretic action is shown here, as in other cases. [See case of Macnab, 23, and subsequent Remarks.]—The relief to the dyspnœa and cough from the removal of the anasarca was very marked in Mackenzie's case, as happens indeed in all instances of the kind.—Although diuretics were of some use, it is probable from the result of the concluding experiment with hydragogue cathartics, that the purgative plan was more suited to the case, and at an earlier period of the treatment would have materially shortened it. The purgative method is certainly too much neglected by many; and where diuretics appear not to answer, it may be often resorted to with great effect, provided there be no tendency to chronic diarrhœa and dysentery.

---

* Water 8252, Hæmatosin 955, Fibrin 48, Albumen 673, Lactates with urea 1.9, Seroline 1.6. The composition of the urine, determined at the same time by Dr Maitland, was Water 9794, Urea 97, Salts 77, Albumen 52.

XXV. Anasarca and Ascites: Troublesome Diarrhœa: Disease of the Kidnies probably in the Middle Stage. Blood deprived of one-half its Hæmatosin and much Albumen. Recovery from the secondary affections under Diaphoretics, Astringents, Cathartics, and Diuretics.

Robert Macculloch, a tall, slender seaman, of intemperate habits,—liable for some years to slight chronic rheumatism, and for a year to some frequency of micturition,—was attacked with chilliness in the beginning of February after unusual exposure in very harsh weather, followed by some swelling of the legs which only continued for a few days. After that he resumed work till the beginning of July 1838, when the swelling reappeared in the legs and soon also affected the scrotum and abdomen. In ten days, when he came under my care in the Infirmary, there was considerable swelling and fluctuation of the abdomen, and great distension of the scrotum and legs, which pitted on pressure. The heart's action was natural. Percussion and respiration were dull in the lower region of both sides of the chest, but particularly of the right: Elsewhere they were natural. No sign of any hepatic disease could be detected. The urine was 1007 in density, thirty-six ounces in quantity, ammoniacal not many hours after being evacuated, not coagulable by heat, but strongly by nitric acid, with brisk effervescence; and its colour was bright yellow. The pulse was natural, the bowels regular, his complexion considerably leucophlegmatic and dingy, his limbs a good deal emaciated. He had not been subjected to any treatment except the administration of cream of tartar for five days.

Pain having supervened in the epigastrium and the pulse having risen in force and frequency, sixteen ounces of blood were taken from the arm ; Dover's powder was ordered every evening ; and diluted sulphuric acid was given to acidulate his drink. The blood was exceedingly buffy, and somewhat cupped ; its clot bulky ; its serum scanty and of the density 1021 ; and it was composed, in 10,000 parts, of 85 fibrin, 561 solids of serum, 728 hæmatosin, 8626 water. The urine passed after the blood-letting and examined while fresh, formed a gelatinous mass by heat and abundant flakes with nitric acid. A few days afterwards the urine was less coagulable, and the œdema considerably diminished ; but he was attacked with chronic diarrhœa, on account of which he was ordered four times a-day a pill containing three grains of acetate of lead and half a grain of opium. Towards the end of July the diarrhœa gradually ceased, and occasional laxatives became necessary. The urine was generally from three to eight pounds daily ; and when its quantity was five pounds, it was 1010 in density, and still very coagulable. In the first week of August, the œdema and ascites had considerably subsided; but little progress having been made for some days, a third of a grain of elaterium was given occasionally as a hydragogue cathartic, and then digitalis was administered in the form of tincture, and bitartrate of potash in powder thrice daily. The Dover's powder at the same time was continued, and the warm-bath was used occasionally. This treatment had eventually, though very slowly, the effect of removing both the ascites and œdema. In the middle of September he had no complaint but weakness, of which he was rapidly recovering. The swelling of the abdomen was gone, and he had only slight œdema of one leg. The urine was five pounds daily, 1008 in density, and still coagulable. He then returned to his employment, at his own request, though advised to remain some time longer in the hospital. The leucophlegmatia continued great.

Remarks.—The account first given by this patient of his complaints led to the supposition that the affection of the kidnies was only of a few days' standing. But the low density of the urine, at variance with his statement, caused a more minute inquiry; when it turned out that his urinary symptoms were of much older date, and that he had been threatened with anasarca five months before. With this view of the case the composition of the blood, which was soon afterwards ascertained, exactly corresponded; for although he never had lost blood before, and had enjoyed a good appetite and sound digestion, its colouring matter was reduced to one-half the healthy proportion. Another condition of the blood worthy of notice was that, in conformity with the presence of a large amount of albumen in the urine, there was a want of that principle in the blood, to the extent of a third part nearly.—There was no evidence of any other organ being affected in the first instance except the kidnies; and the diarrhœa, which afterwards supervened, and indicated irritation or inflammation of the bowels, although it was obstinate, ceased eventually, and left the man in the possession of very tolerable health. His leucophlegmatic countenance however, and his flaccid, emaciated habit, together with the impoverished state of the blood, showed that his state was sufficiently precarious.—The same difficulty and tediousness were encountered here in removing the anasarca as in many other cases of the kind; but the result illustrates what may be accomplished in this respect by steady perseverance.

XXVI. Scarlatina: Diarrhœa: Slight Anasarca. Disease of the Kidnies in the early stage. Recovery.

In July 1836 I visited a stout boy of strumous constitution, 7 years of age, who was labouring under the sequelæ of scarlatina. The scarlatina was moderately severe, and the eruption rather extensive. He did very well till about the twenty-first day, when he was attacked with loss of appetite, vomiting, tendency to diarrhœa, hurried breathing, and irregular fever fits. I first saw him seven days afterwards, at which time these symptoms had much increased. There was a hurried, almost imperceptible pulse; a red, cracked, rather dry tongue; a discharge of frequent, scanty, loose, yellowish, flaky stools; considerable heat and dryness of the skin; short, very hurried, anxious respiration, although both the lungs and the heart appeared from the stethoscope and percussion to be free of disease; much fulness of the belly, tympanitic below the umbilicus, dull on percussion above, tender, firm, yet not unyielding. The complexion was very leucophlegmatic; but nowhere, not even in the eyelids, did there appear to be any distinct œdema, although the legs had been a little swelled a week before. The urine was two or three ounces in twelve hours, 1028 in density, and so coagulable as to form a pulpy mass when heated. He had been treated before I saw him by Mr Sidey, his medical attendant, with mild purgatives, and occasionally a little wine or brandy.

This seemed a fair case for trying the diaphoretic method of cure; and accordingly on the 8th July he began to take the acetate of ammonia frequently, and Dover's powder at night; a warm-bath was used occasionally; and he was warmly clothed in flannel. At the same time mild laxatives were ordered from time to time, such as castor-oil or rhubarb with magnesia, and once or twice a little calomel; and he was allowed wine or brandy in small quantities, nutritive vegetable food, and weak animal soups. The pulse soon became firmer, and the urine gradually increased in quantity and fell in density as well as coagulability. On the 14th there was manifestly less fulness and hardness in the belly, and much less anxiety of countenance. After that the stools became more abundant, less flaky, and more feculent; and the urine copious, pale-blood-red in colour, and decidedly less coagulable. On the 18th the pulse was 100 and pretty firm, the tongue moist, red, and fissured, the evacuations nearly natural, the breathing much less hurried, the appetite improved. There was no longer any vomiting; and the abdomen was not full, and much less firm or tender in the upper region. The urine was 64 ounces daily, still blood-red in colour, 1013 in density, and much less coagulable. On the 25th the tenderness and firmness in the upper region of the abdomen had disappeared, though there still remained some dulness on percussion; the feverishness seldom returned and was not severe; the pulse was 100, of good strength; the bowels constipated, and the evacuations by medicine natural; the urine still blood-red, equally abundant, and slightly coagulable; the countenance very leucophlegmatic; the breathing easy; and the spirits good and active. A grain of acetate of lead was given at Mr Sidey's suggestion thrice a-day. From this time I ceased my attendance.

In the end of October following I found the boy quite well, stout, active, and tolerably ruddy. The urine was pale wine-yellow in colour, and no longer in the slightest degree coagulable. He continued to enjoy excellent health afterwards for more than a year. About that period, he suffered much from numerous abscesses of a strumous character in the left foot and leg, consequent on an injury of the sole of the foot from a nail. A few weeks ago he was attacked with a remittent febrile affection, which has of late been prevalent in Edinburgh among children of his age. The urine is now (November) rather pale, 1011.5 in density, and not at all coagulable, and it is discharged with natural frequency.

REMARKS.—This boy's case is a clear and unequivocal instance of the peculiar irritation of the kidnies which leads to granular deposit having been engendered by the febrile action of scarlatina. The condition of the urine, high in density and excessively loaded with albumen, is characteristic of the early stage of the disease. The secondary affections, which were urgent, were all of them such as are met with in granular degeneration unconnected with scarlatina; but the dropsical effusion, usually the most predominant, was here very inconsiderable. I presume the case will be admitted to be an instance of unequivocal cure. It is rather remarkable that recovery took place under a system of treatment differing widely from that which is generally found necessary in anasarca after scarlet fever; but the state of the pulse left no doubt that the antiphlogistic method was altogether inapplicable. In this, as in all other instances I have encountered of the developement of granular disease of the kidney in childhood, the characters of the strumous diathesis were well marked; and several of the boy's relatives had died of phthisis.

XXVII. Slight Anasarca: Tendency to Chronic Vomiting: Catarrh: Disease of the Kidnies probably in a rather advanced stage. Blood charged with Urea, and deprived of one-half of its hæmatosin. Recovery from the secondary affections.

George Kay, aged 23, a cooper in a distillery, a stout young man of rather strumous constitution, and of very intemperate habits, enjoyed excellent health till January 1838, when he began to suffer from indigestion and vomiting of food. In the succeeding March and April his legs occasionally swelled. Early in May, after having been much exposed in harsh wet weather and getting thoroughly soaked,—his usual occupations being within doors and beside the stills and furnaces,—he was seized with rigors and pain of back, followed by difficult breathing, and swelling of the abdomen, scrotum and ankles. In the beginning of June, when he was admitted into the Infirmary, he had nausea and vomiting, particularly after meals; some pain in the chest on full inspiration, with cough, tough, mucous, occasionally bloody expectoration, and general, loud, sibilant respiration;

puffy swelling of the face, firm œdema of the legs, and some fulness and fluctuation of the abdomen. The pulse was natural, the bowels regular, the urine scanty and pale. He was ordered the spirit of nitric ether, and in a day or two also ten minims of tincture of digitalis four times a-day, and half an ounce of bitartrate of potash every morning. In a few days the urine increased to five pounds, when it was ascertained to have a density of 1011, and to be slightly coagulable by heat as well as nitric acid. Under increasing diuresis the anasarca promptly diminished, and when I took charge of him on the 15th of June, there was scarcely any œdema left except puffy swelling of the face and under the jaws. His complexion was dingy and leucophlegmatic. The urine was ten pounds daily, of the density 1009, and very slightly coagulable. On the 22d of June, as the œdema was entirely confined to the face and neck the diuretics were discontinued, and the warm bath was ordered. Till the 28th the diuresis continued profuse, with manifest diminution of the swelling of the face. But the urine then suddenly fell to only seven ounces in four-and-twenty hours; he had occasional vomiting, much oppression, some drowsiness, and pain in the left flank relieved by passing a little urine. He was immediately ordered a grain of digitalis with as much squill four times a day, and five grains of gamboge finely pulverized with bitartrate of potash; and the warm-bath was given regularly every evening. Next day, the 30th, as no change had taken place, eight ounces of blood were taken from the loins and the gamboge was repeated. The pain was removed by the cupping, and there was no appearance of any increase of œdema, but the urine continued scanty, and the sickness troublesome. On the 2d July he perspired freely after the bath, the sickness ceased, the urine increased to three pounds, and was ascertained to be 1009 in density, and so slightly coagulable as to become only hazy with heat. In two days more the urine rose to twelve pounds. The sickness having returned, the digitalis was abandoned, but without removal of that symptom for a week. In the middle of July, having previously gone on improving quickly, he became subject to chills, and was seized with diarrhœa, tormina, and some pain of the abdomen on pressure; on account of which he had opium and a laxative, and I thought it advisable to take a little blood from the arm, as the pulse had become hard, though not frequent. The blood was buffy and cupped; its serum was abundant, slightly lactescent, of the density 1023, and charged with urea; and its composition was in 10,000 parts 32 fibrin, 619 dry solids of the serum, 721 hæmatosin, 8628 water. The pain and diarrhœa were thus removed. But the urine fell to eighteen ounces, and became strongly coagulable, with a density of 1008.5. For eight days afterwards, during which the bowels were kept freely moving by croton-oil and elaterium, he had occasional sickness, some drowsiness, and considerable languor; and the urine continued very scanty, none being passed except at stool. At length on July 27th diuresis came on and the urine became 1010 in density, when the quantity was above five pounds; yet its strong coagulability continued. His drowsiness now went off, his other uneasy feelings also vanished, the puffy swelling of the face and under the jaws did not increase, while there was no return of œdema of the legs or swelling of the abdomen. Unfortunately it became necessary to dismiss the patient in this state, as he for the second time transgressed the hospital rules by getting excessively intoxicated. At his dismissal he was alert and active, tolerable stout, and in person not emaciated, but his complexion continued dingy and leucophlegmatic.

Remarks.—The disease of the kidnies was here probably somewhat advanced. The history of the patient's first ailments point at suspicious symptoms six months before he came under treatment in May; and the conclusion thus drawn is confirmed by the condition both of the urine and of the blood. The urine was of low density even when scanty, and its coagulability was seldom considerable. The blood had lost one-half its hæmatosin; which was to be ascribed to the disease alone, as blood had not been previously withdrawn in the treatment.—One of the most interesting facts in this case is, that on two different occasions impending coma, the most dangerous of all the secondary affections, seemed to have been successfully warded off. The circumstances were exactly those in which coma is apt to form, namely sudden and great reduction of the urine in the stage of somewhat advanced granulation; and constant drowsiness, sickness and occasional vomiting are the usual precursory symptoms. On both occasions however the employment of moderate blood-letting and brisk cathartics seemed to have the effect of averting the threatened danger.

Nov. 26.—The cure, as in many other cases, was only temporary. Not long afterwards he was readmitted into the Infirmary under the care of Dr

Shortt with another of the secondary affections incidental to the disease in the kidneys. In the beginning of October, two months after his dismissal, some one, ignorant apparently of the predispositions engendered by his primary complaint, administered mercury without due precaution. In four days he was attacked with febrile symptoms and excessive swelling of the neck, face, and head, in connexion with the ordinary mercurial affection of the mouth. On the 18th of October I saw him with this complaint essentially better; but it had sadly broken down what remained of his strength. The œdema had not returned; but he had been several times attacked with diarrhœa. The urine was six pounds in quantity, clear, pale smoke-brown in colour, 1010 in density; and it became merely hazy by heat, though more distinctly coagulated by nitric acid. From his appearance I was led to predict to some of the pupils who took an interest in his case that he would probably soon die of the comatose affection. Accordingly early in November drowsiness appeared as before, and quickly passed into coma, which proved fatal in three days. A good deal of urine was found in the bladder; but the condition of the secretion before death was not ascertained. The left kidney was shrivelled to the size of a large chestnut, and entirely destitute of its natural structure. The right, slightly reduced in size, was lobulated, smooth and pale externally. Internally its cortical structure was finely fibrous, and its tubular structure so much invaded and obliterated by a pale grayish yellow minutely granular matter, that only a part of one tubular mass and small portions of the papillæ of others remained. The cut surface appeared as if sprinkled with fine sand. This case differs from every other I have witnessed, in so far as the tubular portion seemed to be farther advanced in disorganization than the cortical structure. I am indebted for an opportunity of examining the kidnies to Dr Henderson, under whose care he was at the time he died in the Infirmary.

XXVIII. Excessive Anasarca. Catarrh. Probably latent pleurisy. Erythema from distension. Chronic vomiting. Temporary recovery under spontaneous diuresis.

James Taylor, aged 29, a spirit-dealer, who had failed not long before in business, and lived a rather intemperate life, was admitted into the Royal Infirmary under Dr Alison in the middle of January 1837, on account of excessive anasarcous swelling of the legs and trunk. An obscure and equivocating account was given of the commencement and progress of his illness before his admission into the hospital. It appears however that he had been ill of dropsy for about two months, and that he had no urinary complaint till the anasarca began to show itself, when he remarked his urine to be scanty. When admitted, the anasarca affected the whole body, but especially the trunk and legs; the thighs were much distended, and the inside of the right thigh was affected with extensive lurid erythema. There was also much dyspnœa, frequent cough, and bloody sputa. The lower regions of the chest were rather dull on percussion, with obscure respiration ; and the lower third of the right side presented complete dulness and total absence of respiratory sound. In the upper regions there were various catarrhal râles. The pulse was 84, of moderate strength. The urine was scanty, passed with unusual frequency, pretty natural in colour, 1022 in density, and strongly coagulable by heat. He was exceedingly restless, much depressed in mind, and of a very querulous, unmanageable temper. Occasional purgatives were ordered, and for diuretics digitalis in the first instance, then squill, next nitric ether, and also bitartrate of potash, were successively tried ; but for three weeks no impression was made on the urine, which continued scanty, 1019 in density, and highly coagulable. Meanwhile however the erythema was at first subdued by anodyne applications ; the breathing became easier ; and the œdema had subsided a little, probably from the effect of purgatives.

In the beginning of February when I first took charge of him there was still excessive anasarca, great leucophlegmatia, tenderness and extensive erythema of both thighs and left leg, dyspnœa, and occasional cough ; vomiting in the morning had begun to annoy him a few days before ; and he was greatly exhausted, restless, fretful and discontented. Calomel, which had been given for three days only, had begun slightly to affect the mouth. The calomel was discontinued ; a lotion of four grains of acetate of lead and as much opium to the ounce of water was applied to the erythematous parts ; nitric ether was ordered in large doses ; and wine was allowed, along with such articles of nutritive food as his capricious taste could fancy. In a few days the erythema entirely disappeared, and the cough and dyspnœa quickly abated. At first he had a troublesome, watery diarrhœa without pain, under which the œdema seemed to diminish with rapidity. Soon afterwards the urine began to increase; and on the 12th of February it was copious, 1009 in density, and still highly coagulable; but the diuresis was apparently spontaneous, for it was ascertained that he had not taken the nitric ether above a day or two. In the middle of February there was little œdema left; the dyspnœa and vomiting had disappeared; the respiratory sound was everywhere natural except in the lower third of the right side, which continued without either any respiration or resonance on percussion; his appetite and digestion were good; and his spirits were lively. At this time the diarrhœa ceased; but the urine continued to flow for a month afterwards, at the rate of thirteen pounds daily, it was strongly coagulable as at first, and of the density 1010 before coagulation, and 1009 after it. In the middle of March the diarrhœa returned, probably in consequence of errors in diet, which he frequently committed in defiance of all warnings. He also had occasional returns of vomiting in the morning, in all probability from the same cause. Under the use of acetate of lead and opium the diarrhœa was subdued in four days; and great improvement took place in his general feeling of comfort from the use of the warm bath every other evening. The urine now gradually fell in quantity to five pounds on the 21st of March, and to forty ounces on the 27th; its density was 1013; and it coagulated strongly as before. There was a little œdema left before the warm bath was resorted to; but by this time none could be detected even at the ankles at night. The morning vomiting, which was occasionally troublesome, but which never interfered materially with his digestion, yielded to creozote, after hydrocyanic acid had failed. In the beginning of April he continued highly leucophlegmatic; and there was the slightest possible fulness about the ankles towards evening. But he was otherwise free of complaint, and felt pretty strong and active. I was very desirous to retain him some weeks longer under observation; but his discontent and quarrelsome disposition, together with his frequent violation of my injunctions as to diet, compelled me reluctantly to dismiss him.

He had soon sad reason to rue his folly. Towards the end of May the œdema returned and soon became again excessive. Circumstances prevented me from learning accurately the progress of his complaints. But he died in the beginning of July; and I was given to understand that he had been treated for diseased spine, and had six open issues in his back at the time of his death. His friends refused to allow an inspection of the body.

REMARKS.—The disease from the condition of the urine was here probably not very far advanced. The occurrence of diarrhœa and diuresis could not be referred to any part of the treatment; so that this seems an instance of the spontaneous cure of dropsy by means of these evacuations, and especially by a spontaneous flow of urine.—Recovery took place under very desperate circumstances; for it is rare to find dropsy advance so far as to produce extensive erythema, without proving speedily fatal, and for the most part by the inflammation passing to superficial, and then to deep-seated, sloughing. I have seen other remarkable examples of the removal of cutaneous inflammation, more especially of the erythematic kind, by means of the remedy employed in Taylor's case.—There can be no question, from the history of many parallel cases, that he might have survived long in the enjoyment of tolerable health, but for his total want of self-control, and consequent unreasonable neglect of proper diet and regimen.

XXIX. Pneumonia and Pleurisy: Anasarca: Granular disease of the Kidnies probably in the early stage: Blood impregnated with urea. Recovery under the use of blood-letting, laxatives, and diuretics.

James Mossman, aged 42, a harbour-porter, of tall slender form, active, and robust, and long much addicted to intemperance, was attacked in the middle of February 1836 with violent inflammation of the left lung, indicated by very hurried, short breathing, frequent cough, viscid, frothy, rusty sputa, dulness on percussion in the lower half of the left side of the chest, and crepitant respiration in the middle region. He came under my care early in the third day of the attack. I have seldom witnessed a more severe case of pneumonia. The particulars it is scarcely necessary to mention here, though they were highly interesting in several respects unconnected with the object of these illustrative cases. He was immediately bled very largely; nauseating doses of tartar-emetic were administered; calomel and opium were also given freely; and leeches were repeatedly applied to the side in great numbers. These constituted the principal measures, under the employment of which the inflammatory symptoms gradually subsided, so that in the end of February he was considered in that respect fairly convalescent. A great extent however of the left side continued dull on percussion and without any respiratory sound; and from the dulness on percussion being complete, as well as variable in extent, it was evident that pleuritic effusion was present, besides the affection of the lungs themselves. The mouth became affected with the mercury on the last day of February, three days after the mercury had been discontinued; but the affection never became severe. Towards the middle of March it was observed, that his face, which for some time had been leucophlegmatic, began to present some fulness, and his ankles to swell a little and pit on pressure. The urine was then found not to exceed twenty-eight ounces daily, to have a density varying from 1019 to 1023, and to be high-coloured, with some deposit on cooling, and very strongly coagulable by heat. At the time of admission it was ascertained to be not coagulable, and to exceed 1025 in density. The appearance of the anasarca was not attended with any urinary complaints except rather frequent micturition; to which he had been subject for some years. A few ounces of blood were immediately drawn from the arm, and digitalis and squill ordered, as well as bitartrate of potash. For a few days the œdema increased with rapidity; there was much drowsiness; and the urine, which did not exceed thirty-six ounces daily, continued strongly coagulable, and of the density 1018 before coagulation and 1014 after it. The digitalis too began to act on the heart, so as to bring down the pulse to 52, and occasion much exhaustion, on which account it was discontinued. But soon afterwards the bitartrate of potash acted both on the bowels and the kidnies; under which effects the drowsiness went off, and the œdema quickly disappeared before the close of March. The urine in the latter part of this period was steadily about 100 ounces daily, of a cherry-red colour, moderately coagulable, and about 1014 in density; and for a fortnight afterwards, during which the bitartrate was continued, it increased to nearly twice the daily quantity. After this, all medicines being abandoned, it still kept up at 120 or 140 ounces daily, had a density of 1009.5, and was but faintly coagulable. The patient was now almost free of pectoral symptoms, as well as of other complaints, and he rapidly gained strength; but the lower two-thirds of the left side continued dull on percussion, less so however than before, and with here and there some faint respiratory sound. Matters continued precisely in the same state in the end of April, when I ceased to take charge of him. Not long afterwards he went to the country to recruit his strength. In the end of June he was able to walk eight miles without much fatigue. There was no œdema except a little in the right leg in connexion with a scaly eruption to which he had been subject for some years. Percussion and respiration were perfectly natural in the left side. The urine varied from two to three pounds daily, was no longer cherry-red, but natural in colour, had a density of 1014, and was moderately coagulable. The skin of the face was brown from exposure, but the parts protected by clothing were leucophlegmatic. In June of the subsequent year, when I chanced to meet him at work, he stated that he had enjoyed constant good health for twelve months, and was able for all kinds of hard work as a porter. The urine was of natural quantity and colour, 1010 in density, and strongly coagulable. In July of the present year I saw him again. He still continued to enjoy uninterrupted good health, and to work hard as a porter. The urine was then, as formerly, natural in quantity, of a somewhat orange-yellow colour, 1013.5 in density, and coagulable to the same degree as in the previous year.

The blood, which was drawn on the first appearance of œdema, was not buffy. The serum was superabundant, somewhat lactescent, and of the density 1021.5. A small portion of the serum evaporated to dryness, and then boiled with alcohol and treated as described in page 62, yielded with nitric acid a distinct, though not abundant, crystallization of brownish pearly scales. Ten thousand parts of blood contained 82 parts of fibrin, 572 of the solids of the serum, and 755 of hæmatosin.

Remarks.—This is one of the cases which has led me to suspect that it may deserve inquiry, whether granular disorganization of the kidnies may not sometimes originate in mercurial action. The urine was ascertained to be healthy in constitution when the patient first came under my notice. But about four weeks afterwards, and twelve days after the commencement of mercurial action, it was found to present the characters peculiar to the early stage of the disease in the kidnies; and anasarca at the same time made its appearance.—The state of the blood in this case is worthy of attention. It was very defective in albumen, which corresponded, as usual, with the highly albuminous condition of the urine. It contained urea, in connexion with a diminished state of the urinary secretion, and with a tendency to sopor. And it was also materially defective in hæmatosin, containing in fact little more than half the healthy average. The last morbid character may be considered to have arisen rather from the previous frequent depletion and strenuous antiphlogistic regimen than from the operation of the disease of the kidnies, since the latter was merely in its early stage.—I have seldom met with so good an instance of recovery from renal disease,—of recovery so far perfect as to leave no trace of it whatever except a morbid condition of the urine. For more than two years he has continued entirely free of complaint and fit for a laborious occupation. Yet he has resumed his intemperate habits in defiance of earnest warnings on my part. It is fair to presume that favourable circumstances would ensure the preservation of life and health for a considerable term of years.—The success here experienced under the diuretic system seems an argument of some weight against the objection entertained by some to that mode of treatment,—namely that by stimulating the kidnies it tends to promote their organic derangement.

XXX. Pneumonia: tendency to œdema, drowsiness and chronic vomiting; Disease of the kidnies probably somewhat advanced. Recovery from the secondary affections.

Joseph Hodgson, aged 29, a seaman, short in stature, rather slender, but muscular, active, and of temperate habits, was admitted into the Infirmary towards the beginning of March 1836 on account of pulmonary inflammation. Three weeks previously he had two ribs of the right side fractured by a fall; but the inflammation attacked the left side, and not for ten days afterwards. He was several times bled and blistered before coming under my care on the 9th of March. He had then acute pain in the lower third of the left side, increased by coughing, inspiring, motion or pressure; frequent cough, with scanty, clear, tough sputa; considerable dulness on percussion in the affected part, with absence of all respiratory sound below, crepitation above, mucous and puerile sounds in the upper part of the side, and strong resonance of the voice all round the side on a level with the lower angle of the scapula. The pulse was 120, full, jarring, but compressible, the tongue furred, the respirations 34 and labouring; and there was some incoherence. He was immediately bled to twenty ounces, and small nauseating doses of tartar-emetic administered; under which treatment all the symptoms rapidly subsided, so that in three days the pulse was 72, the respirations 15, and the cough trifling, while the left side moved more freely, and the vesicular murmur was heard lower down in the affected part.

At this time my attention was called to the dingy leucophlegmatic complexion of his countenance and a constant tendency to drowsiness; upon examination the urine was found to be six pounds in quantity, 1014 in density, and considerably coagulable; and he stated that about four months before his accident he had œdema after a febrile attack, and for some years had been liable to occasional pain in micturition and the discharge of blood-coloured urine. The tartar-emetic was now discontinued. The pectoral complaints slowly, but steadily improved; and on the 28th of March percussion was pretty clear over the affected part, vesicular murmur was heard nearly to the lower margin of the chest, and slight crepitation existed only at the lowest edge. During all this interval however there was a constant tendency to drowsiness, defective appetite, sickness and occasional vomiting; and the urine varied from five to seven or even nine pounds, was sometimes not coagulable at all, sometimes hazy, sometimes very coagulable, and varied in density from 1013,—which was the highest, the quantity at the time being only three pounds,—to 1006.5, when the quantity was seven pounds. On the 28th of March, as there was some return of cough and expectoration, he was ordered squill mixture with the ammoniated tincture of opium. After this he went on steadily improving. The urine rose to ten pounds daily and upwards; nor did it ever fall materially under that quantity up to the date of his dismissal in the close of April. The drowsiness gradually disappeared; the sickness also ceased to return; and his appetite and digestion became vigorous. In the first fortnight of April he had on two occasions some œdema of the legs for a few days. He was dismissed apparently free of complaint and pretty stout, but still presenting a dingy, leucophlegmatic complexion.

REMARKS.—This is a clear case of pneumonia occurring in the middle or advanced stage of granular disorganization of the kidnies. The date of the commencement of the latter affection cannot well be fixed. But from the low density of the urine it seems probable that the date was not very recent. Yet it is worthy of remark that the patient had been quite recently an active alert man, doing constant duty as boatswain of one of the large steam-ships which ply between Edinburgh and London. The presence of the disease in the kidnies does not seem to have imparted to the pneumonic attack that inveteracy which is usually remarked in all secondary affections. On the contrary the inflammation was subdued with unusual facility. The patient's recovery from the pneumonia, as well as from the other secondary affections which seemed rather to hang over him than positively to break forth, was complete; and under careful regimen it is probable that he would have enjoyed tolerable health for a considerable time,—the progress of disorganization being to appearance arrested. But his profession was unfavourable to the observation of the necessary rules. Accordingly I understand he was readmitted into the hospital four months afterwards. A defect in the records prevents me from ascertaining the nature of his illness on that occasion; but it proved fatal in five weeks, and in the hospital register he is stated to have died of "inflamed glands and diseased kidnies."

XXXI. Violent Diarrhœa: Anasarca: Disease of the Kidney probably not far advanced. Recovery.

James Keith, aged 79, a labourer, of temperate habits, stout, and younger in looks than in reality, was admitted into the Royal Infirmary in the middle of June 1838 on account of obstinate, chronic diarrhœa. He stated that he had always been a healthy man till nine weeks before, when, after exposure to cold and wet, he was seized with severe diarrhœa. When this complaint had continued for a week, his legs began to swell, his breathing became short, and he passed a small quantity of high-coloured urine. Little change took place in these complaints till ten days before he came under my care, when the diarrhœa increased greatly, as well as the œdema. On his admission into the hospital there was very frequent discharge of loose, whitish, frothy stools, much tympanitic distension of the abdomen, but with dulness on percussion and obscure fluctuation in the flanks, and scanty urine of the density 1016, and highly coagulable by heat as well as nitric acid. He was ordered to take four times a-day a pill composed of three grains of acetate of lead and one grain of opium, to have a warm-bath and Dover's powder every evening, and to use only the most digestible and nutritive articles of food. Afterwards nitric acid was also given, a suppository of four grains of opium was administered every evening, and a fetid enema was injected occasionally to promote the discharge of flatus. Under these measures the diarrhœa gradually disappeared before the beginning of July; the tympanitis continued troublesome for some time longer, but also vanished ere long; and in a week more the œdema was confined merely to the ankles. The urine varied from thirty-six to sixty ounces, was of a high orange colour, presented less coagulability, and varied in density from 1005 to 1008 according to its quantity. In the third week of July there was no part of his complaints left except very trivial œdema of the feet; he felt himself able to undertake a long journey to the north country; and therefore at his urgent entreaty he was dismissed.

Remarks.—The most prominent affection here was the diarrhœa; and it was so severe and of so long standing, that, in conformity with previous observations, I was led to draw a very unfavourable prognosis, more especially considering the man's advanced age. Contrary to my fears this affection was promptly subdued. The favourable circumstances were, that, judging from the condition of the urine, the disease of the kidnies was not far advanced, for in that case diarrhœa is always inveterate; and that the man was remarkably entire for his time of life.—Marked relief was obtained from most of the measures resorted to, but especially to the diarrhœa from the suppositories, to the tympanitis from the assafœtida injections, and to the general feelings of discomfort from the warm-bath,—the last of which the patient himself preferred to all other remedies.—The dropsy, which for a long time accompanied the diarrhœa, appeared in the end to be carried off by it.—The case seems a fair one of recovery,—temporary perhaps in the particular circumstances,—yet such as in circumstances more favourable would have been followed by tolerable health for a long term of years.

PRINTED BY JOHN STARK,
OLD ASSEMBLY CLOSE, EDINBURGH.